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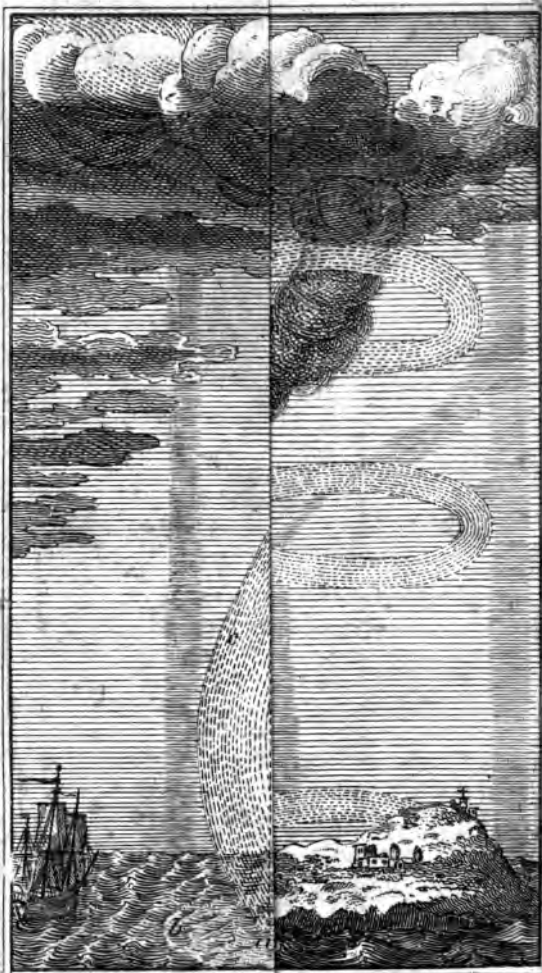








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Lwa.



**AN EPITOME**  
**OF THE**  
**ARTS AND SCIENCES.**  
**BEING**  
**A COMPREHENSIVE SYSTEM**  
**OF THE**  
**ELEMENTARY PARTS**  
**OF AN**  
**USEFUL AND POLITE EDUCATION.**  
**ADAPTED TO THE USE OF SCHOOLS IN THE**  
**UNITED STATES.**

**ILLUSTRATED BY**

**NUMEROUS ENGRAVINGS OF SUBJECTS IN NATURAL HISTORY, AND A VARIETY OF STATISTICAL TABLES.**

---

**THE SECOND EDITION.**

---

"No one is obliged to learn and know every thing, for it is utterly impossible: yet all persons are under some obligation to improve their own understanding

"Presume not too much on a bright genius, a ready wit, and good parts: for these, without labor and study, will never make a man of knowledge and wisdom" **WATTS ON THE MIND.**

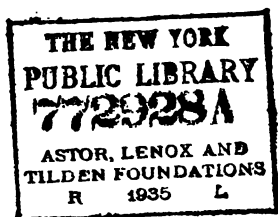
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**PHILADELPHIA:**

**PRINTED BY WILLIAM DUANE.**

.....  
**1811.**





*District of Pennsylvania, to wit :*

BE IT REMEMBERED, That on the twenty-seventh day of September, in the thirty-sixth year of the Independence of the United States of America, A. D. 1811, William Duane of the said District, hath deposited in this office, the title of a book, the right whereof he claims as proprietor, in the words following, to wit:

“An Epitome of the Arts and Sciences: being a comprehensive system of the Elementary parts of an useful and polite Education; adapted to the use of schools in the United States.... Illustrated by numerous engravings of subjects in Natural History, and a variety of Statistical Tables ....The second edition.

“No one is obliged to learn and know every thing, for it is utterly impossible....yet all persons are under some obligation to improve their own understandings.

“Presume not too much upon a bright genius, a ready wit, and good parts....for these, without labor and study, will never make a man of knowledge and wisdom.” *Watts on the mind.*

In conformity to the Act of the Congress of the United States, entitled, “An Act for the encouragement of learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the times therein mentioned” and also to the Act, entitled “An Act, supplementary to an Act, entitled “An Act for the encouragement of learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the times therein mentioned,” and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints.”

D. CALDWELL,  
*Clerk of the district of Pennsylvania.*

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## INTRODUCTION.

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THAT method of education is best adapted to inform the infant mind, which renders the knowledge of things most simple, clear, and distinct. As the greatest part of our early knowledge is derived through the eyes, it is of the greatest importance, that we present objects clearly to the sight ; and that the names which are assigned to things, be accompanied by an explanation of the nature and properties of the things described.

The object which first attracts infancy, is the mother ; to whom, instinct teaches it to look for sustenance : the habit is very soon formed to the association of other domestic objects. The next objects are those of the infant's person, limbs, and members.

As soon as the infant mind begins to discriminate between objects that present themselves to sight.... the emotions of pleasure and surprize are succeeded by desire of approaching and possessing them, or the curiosity of examining and understanding whatever affords delight. The same inquisitive passion, too often erroneously attributed to wantonness, which induces the child to take to pieces the painted toy, prompts its enquiry into the origin and cause, the structure and composition of natural objects. It is the instinct of the species, or reason acting before it is regulated by experience or instruction. This disposition can not be too carefully watched, nor too cautiously obstructed in its efforts to obtain knowledge.

After acquaintance with domestic objects....the first external objects which excite surprize and joy in the young mind, are the heavens. When darkness has restrained the vision, the serenity and silence of the night, the grandeur of the heavens, the expanded

azure, gemmed and studded with millions of transparent points...the moon rising, gently illumines the plains, over which a gloom had been cast...the firmament smiles...and the face of nature losing its solemn aspect, inspires admiration and curiosity...the light of day, and the gloom of night, are recollected and compared...the hills and forests present a contrast of light unlike the day, and of darkness not yet so indistinct as night...the shadows of the mountains, the illumination of their sides presented to the light, is perceived, the contrast is marked by its impression, and the idea is distinct, though it has not a name...trees and buildings are lengthened along the plains or the rivers...and if the ocean be but in view, the imagination is affected by the sublimity of the expanse...the cause of such wonders is sought...the parent, friend, or instructor, informs his pupil...of the universe so vast, the order so perfect...joy and reverence, warm the youthful heart...feelings the most grateful towards the great creator are inspired...the infant who contemplates, is taught to know that he or she form a part of this great work, and thence to value the blessings with which they are endowed...in possessing the faculties to see, to examine, to admire, and to partake as the common gift of God to his creatures, of the bounties of this creation.

This knowledge becomes a study useful and delightful...and gives to the mind, which has been so fortunate as to be directed that way, an elevation....a consciousness of what is right, good, and virtuous, in riper years.

In studying the universe, the young mind soon arrives at a point beyond which, without education, the powers of comprehension are obstructed. The wants of every hour, prove that it is necessary to attend to the concerns of this earth, and to comprehend what is done, and doing upon it ; and these studies open new means of useful enquiry, with the pleasing reflection, that in time, those objects which have excited the infant admiration, may become, when education

shall have formed the mind for their comprehension, sources of greater delight and utility.

Mankind have discovered and invented various means, by which we may become acquainted with the stupendous whole of the visible creation. These means of knowledge, are called arts and sciences....a certain portion of which, is within the power of every one to acquire, and which every one, who is not idle or vicious, will take pains to know.

The knowledge of the universe, is called *Cosmography*, a part of which is *Astronomy*, or the study of the starry heavens.

One of the most interesting and useful studies is *Geography*, which is the science that describes the surface of the earth and the waters. *Geology*, which treats of the composition, structure, and the properties of the materials which compose this earth. *Topography* is the description of a part of the surface of the earth.

To the proper understanding of these branches of knowledge, others are necessary ; and in the conduct of human life, various studies are required. Such as *History*, *Natural History*, *Natural Philosophy*.

*History* treats of the civil and social conduct of mankind...it is composed of two branches....*Chronology*, or what relates to the dates of events, and *Particular History*, which treats of the manner and effect of human transactions.

*Natural History* is connected with *Geography* ; and treats of the climate, soil, vegetable and mineral productions, waters, mountains, and animals of different countries. It comprehends Botany, Chemistry, and Animated Nature.

*Natural Philosophy* is the study of nature, or of the principles and causes of its phenomena ; as the causes of the flux and reflux of the tides ; the principle of the magnet, of electricity, &c.

The pursuit of knowledge is delightful, because we add daily to the stock ; and provide resources for



rational pleasure through life. In a happy country like the United States, every youth has the right to aspire to the honors of public trust, and to serve his country: the individual who is best informed on all subjects, and most correct in his moral conduct, to which nothing conduces more than knowledge, is the most respected and confided in by his associates in youth, and his fellow citizens, when arrived at manhood.

Nor are these branches of knowledge, matters of indifference to the female sex; mental accomplishments are more durable than beauty; and always preferable; the young lady who is accomplished in mind, is the best calculated for friendship and for domestic love....and she who possesses beauty, will improve it still more, by the graces of a cultivated understanding.....and lay up a treasure much more durable than external beauty. The infant mind receives its first impulses from the mother; upon mothers, principally depend the future happiness and virtue of children, and of society at large; it is, therefore, of the first importance, that females should possess correct ideas of that knowledge which is requisite for children of both sexes. To promote these ends, the present work is calculated.

In all cases, instruction should inculcate a knowledge of facts; the things taught should be understood, and nothing conduces so much to accuracy, as the illustration by visible objects, and the exercise of as many of the senses at the same time, as can be applied to any particular object.

The author of this work, uses this means to recommend to the attention of all who are the friends of an effectual system of education, the principles of the method of Pestalozzi.....as improved by Neef, and taught at his school near Philadelphia....a method which, for its excellence, and the wonderful effects which it produces in unfolding the infant mind, cannot be too much regarded by the parents of the rising generation. The present edition of this work, has derived not a little advantage from that system.

---

AN EPITOMÉ  
OF THE  
ARTS AND SCIENCES.

---

CLASS I...LESSON I.

OF THE ARTS AND SCIENCES.

---

"The taking a taste of every sort of knowledge is necessary to form the mind, and is the only way to give the understanding its due improvement to the full extent of its capacity." LOCKE.

---

*Teacher.* ALL our individual happiness and the good which we obtain in society, all the good we do for others and for ourselves, depend upon the manner in which we think and act; it is therefore necessary to know what is right and what is true, and what is wrong and untrue, so that we may *think correctly* and *act properly*, and this is the object of education.

*Pupil.* How shall we learn to think?

*Teacher.* By means of our senses properly used, that is, by *seeing*, *hearing*, *tasting*, *smelling*, and *feeling*; through these we acquire all ideas of sensible objects: besides the senses,

we have the faculty of *mind*, and the operation of these senses or faculties combined is called *intellect*, upon which depend the faculties of *memory* and *reason*, by means of which we compare objects that are present with each other, and with others which we remember to have seen, and we form opinions thereupon.

*Pupil.* What is the method best to be pursued in order to acquire correct knowlege?

*Teacher.* The best method is that which is most simple, and which leads to the most correct knowlege of particulars.

*Pupil.* How shall we accomplish this?

*Teacher.* All the subjects of knowlege are generally classed under the denominations of *Arts and Sciences*; young persons must commence with the particulars of some one part of the arts and sciences, and proceed from particular to particular; and so with every branch.

Q. What is the general denomination of science?

A. Natural philosophy.

Q. Are there any rules or methods prescribed to render the acquiring of knowlege easy?

A. Yes: Natural philosophy as a science arranges the various objects of knowlege into classes, and thus renders their acquisition easy ....it is best always to begin with the most simple and familiar subjects, and so proceed to those that are less familiar or simple; they may be classed thus:

First. An acquaintance with our bodily form and members, and our mental faculties.

Second. An acquaintance with all objects directly within the reach of our senses, and which we have the power to touch and examine.

Third. Those kinds of objects which are within the reach of our senses but not within our power.

Fourth. Abstract or indirect knowlege.

All of these subjects are comprehended under the terms Arts and Sciences.

*Quest.* What is a particular science ?

*Ans.* A certain and evident knowlege of something ; a system of facts upon which reason is employed, and causes and effects made demonstrable by known rules.

*Q.* Are there various descriptions of science ?

*A.* There are several....some class them into three divisions ; the practical, the speculative, and the ornamental ; the mathematics are practical ; theology and metaphysics speculative, poetry ornamental.

*Q.* Is there any other definition ?

*A.* Yes ; it is now generally admitted that the knowlege of a science consists in the proper understanding of the language of that particular science ; not of the mere words or names, but of the properties of the things first, and then the application of the language to the things.

*Q.* What is art ?

*A.* Art is the mode of doing a useful thing readily, by method, and according to previous design.

*Q.* Are not the arts divided like the sciences ?

*A.* They may be classed under two heads, the liberal and the necessary.

*Q.* What are the arts that you call liberal ?

*A.* Experimental philosophy, grammar, rhetoric, printing, music, architecture, painting, and sculpture : and all that depend on the mind and on the sciences.

Q. What is meant by abstract or indirect knowledge?

A. To discriminate between what is merely *sensible*, or derived directly by seeing, hearing, feeling, tasting or smelling; and mathematics, ethics, logic, and all those sciences which are derived from the *intellect*, and therefore *abstracted* from matter; those that treat of matter being called *physics*, and those of the intellect *metaphysics*.

Q. Why are they called *liberal*?

A. Because the ancients allowed them to be studied only by the *liberi* or free persons.

Q. What are the arts which you call necessary?

A. Those which contribute to the human comforts or supply their wants; such as those of the farmer, miller, and millwright, the weaver, taylor, clothier, shoemaker, smith, carpenter, mason, and similar arts, usually called trades.

Q. Which of these two are most useful?

A. That is very easily understood by asking another question, which of the two you could best do without?

Q. You mean that we could do very well without some of the liberal arts, but could not do without the necessary arts?

A. That is precisely what I mean; for in other countries from which we have borrowed prejudices, it is too much the custom to depreciate the most useful pursuits of society; but we should learn to think well of what we cannot do without.

## CLASS I....LESSON II.

## OF NATURAL PHILOSOPHY.

Q. What is to be particularly understood of natural philosophy?

A. It is the study of all that exists in nature and it is therefore the great science, as it comprehends all the other sciences, under a particular arrangement: thus. 1. The study of all subjects in which the senses act without the exertion of the will, as we see, and hear, and smell, and taste, and feel, when we may not have any inclination or desire to do so. 2. All those studies in which we employ the reasoning faculty. Another division is into four parts, as in the first lesson. And there is a third classification, all objects being made to belong to: 1. memory: 2. reason: 3. imagination; but these three are so intermixed with each other, that however fanciful the arrangement, it cannot be considered as clear or definite. There is another which is very simple, which divides all the subjects of natural philosophy into three branches.

1. The principles and properties of matter, also called *physics*.

2. The nature of spiritual things, or such as are deduced from the intellect or reason, from analogy or hypothesis, and called *metaphysics*.

3. Morals or ethics.

Philosophy is the method of forming conclusions from the data furnished by science; or science consists of facts and philosophy of opinions—science is speculative, art mechanical; science plans, art performs, philosophy judges.

Q. What do you understand by the word matter?

A. It is the general term by which every thing that has substance and form is expressed ; all matter, for example, is long, broad, and thick ; and has beside the properties of solidity, divisibility, mobility, and inertness.

Q. What is the explanation of solidity?

A. It is the property of every substance or body, which causes it to occupy a space equal to its dimensions, and prevents any other substance from occupying the same space.

Q. How do you make this satisfactory to the senses?

A. If you place a stone or a piece of wood in any place, no other substance can occupy exactly the same place, unless the stone or wood be removed. Water and air for that reason are substances, though vulgar prejudice has presumed that air is not a substance.

Q. What do you mean by divisibility and mobility?

A. All matter may be divided, as a stone may be broken into several pieces, this shews that the parts are divisible ; gold is so divisible, that if 5760 grains of silver be melted with one grain of gold, the gold will blend itself with every grain of the silver ; that is, there will be some gold in each grain. Mobility is the property of matter by which it is capable of being moved from one place to another.

Q. What is inertness?

A. It is simply *inactivity*, or that property of matter by which it would forever remain in the same place, if it was not put in motion or moved by something ; thus a billiard ball or a marble

would remain if not forced in some direction ; but the same force used on a pavement, on a carpet, or on a smooth plane of ice, will be unequal, as when put in motion, it meets with more resistance on the first and less on the last. Thus a person standing in a boat at rest, and the boat is suddenly pushed off, the person falls backward ; if in a swift motion the boat be stopt, the person falls forward ; such, also, are the effects in a carriage.

Q. Has matter any other properties ?

A. It has several, which we shall notice when we come to natural history : for example, all bodies have five kinds of attraction....called cohesion, gravitation, electric, magnetic, and chemical attraction ; beside capillary attraction, which is considered a qualified cohesion ; and the power of resistance or repulsion.

Q. What are the principal sciences ?

A. Physics, mathematics, astronomy, geology, geography, medicine, history, logic, ethics, theology, metaphysics, government, jurisprudence, poetry.

Q. The arts and sciences appear to be very closely allied ?

A. They in many cases are the same ; physics or natural philosophy for example is both natural and experimental ; and rhetoric and grammar belong to philosophy, as do all the arts which are not merely manual ; many of the arts are wholly chemical ; and yet chemistry is one of the most interesting of the sciences.

Q. Physics then is not a single science ?

A. No : several branches of knowledge are comprehended under that name....as the knowledge of the human body and of the elements of



all that belongs to natural history, animal, vegetable and mineral ; and of the causes of various natural occurrences, such as earthquakes, eclipses, meteors, and the like, though each of these have connexion with other branches of science....as eclipses with astronomy and the mathematics, earthquakes with geography and chemistry, &c.

Q. Are physics not known by some other name?

A. Yes : the same idea is sometimes conveyed by the word *physiology*, but this word is by custom confined to subjects of organized matter or the animal economy.

Q. Beside our five senses, and those faculties of reason and memory, which form intellect, are there not certain other faculties?

A. Some philosophers assign names of various kinds to different operations of the mind and senses, but it requires some maturity of mind to *perceive* them distinctly.

Q. How are they named?

A. They are described under the name of the *perceptive faculty*, which is no more than *sensation* and intellect combined ; and are thus classed : 1. External sensation ; 2. Consciousness ; 3. Memory ; 4. imagination ; 5. Dreaming ; 6. Speaking ; 7. Abstraction ; 8. Reason.

Q. Are there not other denominations for these faculties?

A. Yes, some make out a list of what they call secondary senses, which are called taste, the sense of novelty, sublimity, beauty, imitation, harmony, laughter, and sympathy, and others, all of which properly belong to the class of metaphysics.

## CLASS I....LESSON III.

## OF THE CREATION.

Q. What is the most sublime of all the objects of science ?

A. It is that which developes the principles of creation, and which raises us to the contemplation of a superior and intelligent being, who has impressed motion on matter, who eludes our senses, but whose presence is ever manifest in his works. The sensible and material objects which compose the universe, demand the second place. What can be more worthy of admiration, than those constant and unalterable laws, by which all those bodies are governed, which from the surface of the earth throughout the canopy of Heaven, are displayed around us in such vast profusion ! Next comes man to engross our attention. His relations, considered as an individual, or as a social being, his labors, his discoveries, in short, whatever he has invented or performed.

## OF COSMOGRAPHY.

Q. What is cosmography ?

A. A description of the Heavens and the earth ; in a word, the whole universe, which is divided into two parts ; astronomy and geography.

Q. How is this science most easily acquired ?

A. As the figure of the world is round, we make use of two globes, one called the celestial globe : upon the surface of which is painted the stars, formed into constellations, with the circles of the sphere ; the other globe is called the terrestrial, which shews us upon its surface a delineation of the land and water.

Q. What do you call the Heavens ?

A. Those regions of space, which in common discourse we call the sky, or the air, which we perceive all around us above the atmosphere, in which are situated all the shining bodies, the sun, moon, planets, and stars.

#### GEOLOGY.

Q. What is the science called geology ?

A. It has for its object the structure and principles of the formation of the globe we inhabit ; and it embraces investigations and conjectures on its origin and internal composition ; and the study of the particular composition of its various parts. There are two classes of philosophers, who hold different opinions on its origin, and they argue from the appearances which the earth presents, its solid masses, and its waters ; these two classes are designated by their systems, which are the *Plutonians*, or those of whose theory fire is the principle ; and the *Neptunians*, the principle of whose theory is water.

Q. Who were most eminent in these classes ?

A. Among the first were Des Cartes, Leibnitz, Buffon, who supposed the earth to be of the same nature as the sun ; and Whiston, who supposed the earth to have been a *comet*, composed of a fragment ejected from the sun, and after a time cooled down.

The Neptunians, were Burnet, Pallas, Hutton, Woodward, De Luc, Kirwan, and La Methe-rie, assert a watry origin. The first class suppose the earth to contain a mass of fire in the centre ; whence volcanoes are accounted for. But the second class believe the earth to be solid, and account for volcanoes upon chemical principles ; it being known that iron filings and sul-

phur placed under ground, will take fire and explode....so volcanoes may arise from iron and sulphur brought together by alluvion.

Q. Is this the whole science of geology ?

A. This science treats of the encrease and decrease of the land and waters, and the composition of mountains, and the general surface of the earth, which is described as composed of classes of rocks which are called *primitive* and *secondary*, formed principally of three ingredients, variously intermixed, that is *silex*, *alumina*, and *magnesia*....constituting the following: 1, granite ; 2, gneiss ; 3, mica slate ; 4, clay state ; 5, primitive limestone ; 6, primitive trap ; 7, serpentine ; 8, porphyry ; 9, sienites ; 10, topaz rock ; 11, quartz rock ; 12, primitive flinty slate ; 13, primitive gypsum ; 14, white stone.

But there is another classification of rocks into five kinds. 1, primitive, composing all that we have above noted ; and four others comprehending all the secondary class ; 2, rocks of transition ; 3, stratified or secondary rocks, by alluvial deposition ; 5, volcanic rocks.

The secondary class, supposed to be the result of decomposition and solution, by heat, air, and water, are : 1, old red sand stone ; 2, first old floetz or lime stone ; 3, first or oldest floetz gypsum ; 4, second or variegated sand stone ; 5, second floetz gypsum ; 6, second floetz or shell lime stone ; 7, third floetz or sand stone ; 8, rock salt formation ; 9, chalk formation ; 10, floetz trap formation ; 11, independent coal formation ; 12, newest floetz trap formation.

All the surface of the earth is composed of one or more of these materials ; the latter are called alluvial, and may be divided into two classes....1, deposits formed in moun-

tainous countries, and found in vallies composed of solid masses of rock, gravel, sand, loam, fragments of ores, and sometimes precious gems; the soil of low flat countries, as peat, sand loams, bog iron-ore, breccia, tufa, stalactite, &c

All these and other natural parts of the globe are particularly investigated by the aid of two other sciences....*mineralogy*, which classes all the hard substances, and discriminates their characters; *chemistry*, which by decomposing them exhibits their elementary principles.

#### OF THE ATMOSPHERE.

Q. What is the atmosphere?

A. A transparent, invisible, and impalpable liquid matter, composed of air and other matter encompassing on all parts the terrestrial globe, and at times resembling vapor or smoke. Its use is to furnish winds and rain, and serve for the common purpose of breathing; it is also the cause of the morning and evening twilight.

Q. What is the extent of the atmosphere?

A. It is extremely difficult to determine its exact height. Were it as dense as on the surface of the earth, it would not exceed six miles. In general, however, it is supposed to be about twenty-seven or twenty eight miles; and its greatest altitude cannot be more than forty-five or fifty miles; for the more distant from the earth it is, the thinner and lighter it becomes, and a smaller quantity of it occupies a larger space. We may justly say the atmosphere serves as a veil or covering to the earth.

Q. Is the atmosphere heavy?

A. The atmospheric air, by experiments, has been found to be 914 times lighter than water.

It is this, even near the surface of the earth, where it is the heaviest: in the higher regions it is still lighter. For the air is composed of a high, middle, and lower region.

The air of the higher region is more subtle and more cold than that of the middle; and that of the middle is finer than the lower.

The weight of a column of air, reaching from the surface of the earth to the top of the atmosphere, is equal to that of a column of water, of the same diameter, 33 feet high; for so high, and no higher will water rise in a pump, by the pressure of the external air, after the air within the pump has been extracted by the piston or sucker. Now the weight of a square column of water, one foot thick, and 33 feet high, is 2160 pounds; so that a man of a middling size, the surface of whose body is 14 square feet, sustains a pressure of air of 30240 pounds, when the air is of a moderate gravity; a pressure that would be insupportable, and even fatal to him, were it not that it is equal on every part, and counterbalanced by the spring of the air within him, which is diffused through the whole body, and re-acts with an equal force against the outward pressure. Hence it is that a column of mercury in the barometer, from the same principle, does not rise higher on a medium than 29 inches and a half, its specific gravity to that of water being nearly as 14 to 1.

#### OF METEOROLOGY.

Q. What is a meteor?

A. A meteor generally is any matter engendered in the air which surrounds us, and which puts on the appearance of a fire or flame, so as

to become visible to our sight. It comprehends numerous objects; as clouds, aurora borealis, what is usually called *falling stars*, and the rainbow is a meteor.

Q. How are they treated of?

A. Meteorology is reduced to a science, and into three classes or kinds: 1, igneous or fiery; 2, aerial or volatile; 3, aqueous or watery.

Q. What is generally supposed to be the cause of the common evening meteor?

A. Some recent publications assert that from a meteor of this kind, a matter has been caught having the properties of lime.

Q. It would then appear that a meteor is something collected in the air which is inflammable.

A. Certainly: modern chemistry has shewn that even various kinds of air brought into contact take fire and explode.

Q. Are there not other meteors?

A. Luminous appearances are often seen in the heavens; balls of fire of great apparent bulk have been seen passing rapidly across the horizon; the aurora borealis, or northern light, is a very splendid meteor; very heavy stones have descended from the atmosphere, the origin of which cannot be accounted for; some have supposed these stones to have been cast off from some one of the planets or from some comet.

Q. Will you describe what relates to the rest of the universe, the planets, comets, and so forth?

A. In subsequent classes the most curious objects of nature shall be described; but it is necessary first to enquire concerning matters that will enable us better to comprehend them.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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CLASS II....LESSON I.  
OF LOGIC.

Q. What is logic?

A. The art of using reason well in our enquiries after truth, and the communication of it to others.

Q. In what does this art consist?

A. It consists in the knowledge of facts, and the application of the reflections made by men through the four principal faculties of their mind, perception, reasoning, disposition, judgment.

Q. By whom is logic as an art, most employed, and to whom most useful?

A. Whoever reasons well is a good logician; but it is most employed, and with method, by those persons who have to teach or reason with others; legislators, lawyers, preachers. It is useful to all men; and all men who think and judge for themselves, employ logical rules without being conscious of it: for the art is only the natural system of reasoning methodized and committed to writing.

Q. What is understood by perception?

A. It is the faculty of comprehending in the mind, and discerning the nature of what we see or contemplate, and it may be sensible or abstract, we see a house, a tree, a stream, and



know what they are ; so we are conscious of the existence of our country, of our parents, or of our happy form of government, of time, motion, of trade, life, virtue, and various other subjects.... the result of the perception is an *idea*.

*Reasoning*, or argumentation, is that operation of the mind, by which we draw our conclusions on any any subject which is in itself not clear, from a comparison with other similar subjects that are known, and evident. These inferences or conclusions are the effect of reasoning, and the propositions upon which they are founded we call a syllogism or argument ; as virtuous men are governed by their ideas of good and evil ; .... Thomas is a virtuous man, therefore he will not do what is evil. Or thus,

No virtuous man is a slanderer,  
But Janus and Silenus are both slanderers.  
Therefore neither of them are virtuous.

There are various kinds of syllogism.

*Disposition* or arrangement, is that order into which we put our perceptions and reasonings on a subject, so as to obtain the clearest knowledge of it, to retain it longest in our minds, and communicate it to others most effectually.

*Judgment* is that act of the mind by which two or more conceptions or ideas are combined, either in asserting or denying something, the result of which is called a proposition....as the rocks and trees do not think ; good men are often the victims of bad men ; virtuous men are governed by their ideas of good and evil.

This sketch of the system of logic is an example of disposition, as it arranges the principles by which we perceive, reason, and judge, upon all subjects.

## CLASS II....LESSON II.

## OF POETRY.

Q. What is poetry?

A. It is the art of writing or speaking according to a certain harmonious arrangement of words, by measures or proportions of time, accent, and sound.

Q. Has not poetry other names?

A. It is also called verse, from being constructed in verses, thence the art is called versification; and it is also called *metre*, because it consists of certain number or measure of syllables or sounds.

Q. What is a poem?

A. A complete and finished piece of poetry, such as the *Illiad* of Homer, the *Eneid* of Virgil, and the *Columbiad* of Barlow: there are lesser poems, and of various species...in rhyme and blank verse.

Q. What is the difference between those two kinds of poetry?

A. Rhyme is that kind of verse in which the terminating sounds are alike, or respond to each other. Blank verse is measured by equal quantities of sound, but does not rhyme. The following are specimens of blank verse and of rhyme.

Begin with gentle toils ; and as your nerves  
Grow firmer, to hardier by just steps aspire.  
The body, moulded by the clime, endures;  
The equator heats or Hyperborean frosts  
Except by habits foreign to its turn,  
Unwise, you counteract its forming power:

ARMSTRONG.

As new awaked from soundest sleep,  
Soft on the flow'ry herb I found me laid  
In balmy sweat, which with his beams the sun  
Soon dry'd, and on the reeking moisture fed.

MILTON.

Seek you to train your fav'rite boy ?  
Each caution, every care, employ :  
And ere you venture to confide,  
Let his preceptor's heart be try'd ;  
Weigh well his manners, life and scope,  
On these depend thy future hope.

GAY.

O ! could I worship ought beneath the skies  
That earth hath seen, or fancy could devise,  
Thine altar sacred liberty, should stand,  
Built by no vulgar mercenary hand,  
With fragrant turf, and flowers wild and fair  
As ever dress'd a bank, or scented summer air.

COWPER.

Hail man ! exalted title ! first and best,  
Of God's own image by his hand imprest,  
O ! man, my brother, how the cordial flame  
Of all endearments kindle at the name !  
In every clime, thy visage greets my eyes,  
In every tongue y kindred accents rise ;  
The thought expanding swells my breast with glee,  
It finds a friend, and loves itself in thee.

BARLOW.

Q. Are there no other measures besides these ?  
A. There are those of ten, eight, and seven

syllables, and various others.

Q. Give me an example of each.

A. That of ten, is the measure of the two preceding extracts from Cowper and Barlow ; as are those from Armstrong and Milton in blank verse ; and the following,

Immodest words admit of no defence,  
For want of decency is want of sense.

ROSCOMMON.

Verses of eight, which is an usual measure  
for short poems.

And may at last my weary age  
Find out the peaceful hermitage,  
The hairy gown and mossy cell,  
Where I may sit, and nightly spell  
O'er ev'ry star the night does shew,  
And ev'ry herb that sips the dew.

The extract above from Gay, is in the same  
measure.

Verses of seven; called Anacreontic, from  
Anacreon, a Greek poet, who wrote in verse of  
this measure.

Fairest piece of well form'd earth,  
Urge not thus your haughty birth.

Q. In what principle does the perfection of  
poetry consist?

A. In the English language it principally de-  
pends on the modulation of the accents and the  
disposition of the pauses, and this modulation  
is various in different kinds of measure....the  
following is an example of which the sense  
shews the character:

Sofly sweet in Lydian measures,  
Soon he soothed his soul to pleasures;  
War, he sung, is toil and trouble,  
Never ending still beginning,  
Fighting still and still destroying;  
If the world be worth thy winning,  
Think, O think it worth enjoying.

Q. Which are the kinds of poetry most in use ?

A. The kinds of poetry are various : the most considerable sorts are 1st, *Pastoral*, which describes a shepherd's life, or that of rural nymphs and swains. 2d, *Elegy*, is a mournful poem, or funeral song. 3d, *Lyric Poetry*, is generally used in the composition of songs and odes. 4th, *Pindaric ode* (so called from its inventor Pindar) is a species of poetry which consists of loose and free numbers, and unequal measures. 5th, *Satires*, are free, jocose, witty, and sharp poems, severely inveighing against vice and all corrupt manners and persons ; all measures are employed in satirical verses. 6th, *Comedy*, is an agreeable imitation of the actions, humors, and customs of common life. 7th, *Tragedy*, in which the calamities of virtuous and illustrious persons are represented, to excite the sympathy of the spectator, constancy, patriotism, and the social and heroic virtues. 8th, *Epic or Heroic Poetry*, is a poetical narration of some illustrious and important actions of the hero celebrated in the poem ; as the great exploits of Achilles in the *Iliad* of Homer. 9th, *Epigram*, is an inferior sort of poem, whose peculiar character is brevity, beauty, and a sharp turn of wit at the end.

As to the Acrostic, Rondeau, Charade, Echo, Rebus, &c. they are trifling pieces of art, adapted to mirth and innocent amusement.

## CLASS II....LESSON III.

## OF LANGUAGES.

Q. What is language ?

A. It is the speech or tongue of one nation, distinguished or differing from that of another.... Or it is the set of words made use of by a people to communicate their ideas to others ; the act of communication is called speaking, or the speech of the individual.

Q. Upon what principles is language formed ?

A. All languages in their beginning appear to have been produced from the first efforts of man to make known his wants and his affections to his fellow creatures. It must at first have been very simple, and composed but of few words, parts or members.

Q. What is most necessary to the acquirement of a correct knowledge of language ?

A. The only true and certain method is by acquiring first a correct idea of natural objects, each individual thing separately ; and to consider the names as only signs of each particular ; after which an acquaintance with the rules of those languages in which the things are spoken of.

Q. Are there fixed rules by which a language is regulated ?

A. Among rude and unlettered people it is without rules ; but civilized nations have reduced their several languages to systems ; but generally there are too many rules that are useless.

Q. Are more than one language necessary ?

A. Not in the first instance ; the language of your country is the most essential, and in it is to be found as much knowledge as in any other ; but

a correct knowledge of other languages is always of great use.

Q. Whence has it arisen that there are various languages?

A. The same causes which gave rise to the number of nations produced this variety; climate and the natural productiveness or sterility of the soil, have had their influence on language, because neither the same objects were to be seen, nor the same wants, nor the same passions equally felt every where; the inhabitants of the torrid zone never see *snow*, *ice*, nor *frost*, they of course require no words to express these ideas; the inhabitants of the frigid zone have no words to express the idea of an *elephant*, a *pine-apple*, or a *crocodile*. Besides language was first only spoken, ages must have elapsed before arbitrary signs or letters came to be invented, and an original language written.

Q. How are the rules of language regulated?

A. By the system called grammar, from the Greek word *grammata*, which means *letters*.

#### OF WRITTEN LANGUAGE.

Q. What is Grammar?

A. It is the art of expressing intelligibly and correctly our thoughts, by words written or spoken.

Q. Is grammar reduced to written rules?

A. Like other sciences, it has been divided into parts.

Q. Which are they?

A. There are four; 1. *Etymology*, or the derivation of words, so as to shew their original signification. 2. *Orthography*, the proper manner of using letters to signify words; 3. *Syntax*,

the right arrangement of words in speaking or writing ; 4. *Prosody*, or the proper pronunciation and accent of speech.

Q. Are there not other principles of grammar ?

A. There are certain principles of grammar which are called universal, and in which all nations and languages agree ; but the rules of grammar not only differ in different languages, but very perplexing differences exist among those who speak the same language, which contribute to render the knowledge of its true principles uncertain and difficult to acquire.

Q. Whence have those differences arisen ?

A. From mistakes very natural to the human mind ; for example, language was formed only for the communication of thought, and has been considered *singly* in that view ; words, therefore, were taken to be no more than the signs of things, and thence that there must be as many words as things. While this notion prevailed, there were only two or three parts of speech.... first, *nouns*, which denote *things*, as food ; and *verbs* which denoted ideas of *actions* or of wants ; to these were soon added what have been called *particles* by some, and *connectives* by others. This was in the infancy of grammar.

Q. What was the next stage ?

A. Aristotle added a fourth part of speech this was called the *definitive* or *article* ; it was presumed that all words must belong to one or other of these four classes ; but it was soon found that some words would not enter into this association ; and this caused the first suggestion that the system of as many sorts of words as sorts of things must be abandoned.

Q. What was the effect ?



*A.* Making what was bad worse ; instead of taking signs or words as the representatives of things, they travelled backward, and made things the representatives of signs or words ; or in other terms, they said that there must be as many different things as there were signs,...and soon from four, the parts of speech were extended to 20 and to 30 ; those who acknowledged the fewest admitted 8 parts ; and this was long a favorite number ; though some who rejected the article still counted 8 ; and those who admitted the interjection still counted 8 ; but in what the difference consisted that entitled those words to be ranged in one or other of the eight classes, was never explained.

Q. Was there no light shed upon it ?

*A.* Aristotle had held words to be the signs of ideas, and ideas the signs of things....but this had its opponents ; at length it was found that words were the signs or representatives both of ideas and of things ; and that there were words formed or abbreviated, which became the signs of other words, and that the use of dispatch in language which had been lost sight of, caused abbreviations.

Q. How were abbreviations introduced ?

*A.* In three ways....1. In terms. 2. In sorts of words. 3. In construction.

Q. What is the best work on this subject ?

*A.* Locke's third essay on the use and signification of language, is the best work existing on the first branch ; *Taoke's diversions of Purley*, has shed still greater light ; but the other branches are yet to be completely illustrated.

Q. Are there none of those universal rules allowed by good writers and speakers ?

*A.* There is a tacit agreement in this principle, that the whole of grammar may be reduced

into two classes of words. 1. Those necessary for the communication of thoughts. 2. Abbreviations.

Q. How is this classification applied ?

A. The first class is subdivided into two parts.

1. Noun....which is the sign of an idea, or an impression on the mind.
2. Verb....the term signifying an action or describing the impression.

Q. But what of abbreviations ?

A. This class is also subdivided :

1. Abbreviation of terms.
2. Abbreviation in the manner of signification of words.

Upon these two depend the excellence of language ; because if every idea were to have a particular name, all language would be but a collection of names ; but combined words expressing an endless variety of ideas, lessen the number of names, or nouns, and render language more concise. All language, therefore, is principally composed of general terms ; and this is not the effect of ignorance or chance, but of reason, skill, and necessity.

Q. Is there then no true system of grammar ?

A. There are several systems....and the principles are daily becoming better understood ; but the old order, somewhat improved, is still received and taught.

Q. What are the languages most esteemed by civilized nations ?

A. The Greek and Latin among the dead languages ; which are distinguished on account of the celebrity of the nations to which they belonged, and particularly valued, as all ancient learning of the first importance is to be found in those languages ; they are important in various

respects....the Latin language owes as much that of Greece, as the Roman reputation owes to the Grecian example : to the Greek we were forced to resort for terms of science ; a great portion of our language is derived from the Latin, which is also the basis of the Spanish, Portuguese, French, and Italian.

Q. Are the Greek letters the same as the Hebrew, or like those which we read ?

A. Not exactly like either, though there is a remote resemblance of both. The Greek letters are as follow....and their powers are expressed by the Roman letters in the same line

<i>The name.</i>	<i>Num.</i>	<i>Forms.</i>	<i>simls.</i>	<i>Sound or Power</i>
Alpha	1	A	α	a
Beta	2	B	β	b
Gamma	3	Γ	γ	c
Delta	4	Δ	δ	d
Epsilon	5	E	ε	e <i>short</i>
Zeta	6	Z	ζ	z
Eta	7	H	η	e <i>long</i>
Theta	8	Θ	θ	th
Iota	9	I	ι	i
Kappa	10	K	κ	k
Lambda	20	Λ	λ	l
Mu	30	M	μ	m
Nu	40	N	ν	n
Xi	50	Ξ	ξ	x
Omicron	60	O	ο	o <i>short</i>
Pi	70	Π	π	p
Rho	80	P	ρ	r
Sigma	90	Σ	σ	s
Tau	100	T	τ	t
Ypsilon	200	Υ	υ	u
Phi	300	Φ	φ	ph or f
Chi	400	Χ	χ	ch
Psi	500	Ψ	ψ	ps
Omega	600	Ω	ω	oo <i>long</i>

Q. What is meant by the numbers of the second row?

A. They each represent the number which the Greeks expressed by the several letters when used arithmetically.

Q. There were several dialects of the Greek?

A. Yes, but the Doric was considered to be the most copious and ancient; the *Attic* the most elegant; the Spartan dialect was remarkable more for the conciseness of the manner of the speakers than for any difference in the language; from their style is derived the term *laconic* used to signify short speeches;....as "say something better than nothing, or say nothing."

Q. What other languages are esteemed?

A. Beside the Greek, being the language of the new testament, the Hebrew is much regarded as the language of the old.

Q. What is remarkable in the Hebrew?

A. 1. Its alphabet consists of 22 letters. 2. Each of these represent numbers. 3. That many words occur without any of the vowels, which may be pronounced as if a short *e* or *a* stood between the consonants; as דבר DBR, pronounce *Deber* or *Dabar*; שקד PQD, *pequed* or *paquad*. 4. That most feminine nouns end in the ם or ת, most others are masculine. 5. That the plural masculine is formed by adding ם and the plural feminine by adding ת to the singular. 6. That the verbs have only *two tenses, past and future, and two genders, masculine and feminine*. 7. That Hebrew is read from the right hand to the left, and not from the left to the right, as the English and other western languages.

<i>The name.</i>	<i>num.</i>	<i>form</i>	<i>finals.*</i>	<i>simls.</i>	<i>Sound or Power.</i>
Aleph	1	א			a broad, as in war
Beth	2	ב		כ	b
Gimel	3	ג		ג	g hard, as in
Daleth	4	ד		דד	d [give get
He	5	ה		חח	e as in where
Vau	6	ו		וּ	u as oo, w before
Zain	7	ז			z [a vowel
Heth	8	ח		ה	h hard aspirate
Teth	9	ט		טט	th
Yod	10	י			i like ee
Caph	20	כ			k or c hard, as
Lamed	30	ל	ך 500		l [come
Mem	40	מ			m
Nun	50	נ	ם 600		n
Samech	60	ס	ץ 700	ש	sh
Oin	70	ע		ע	o long, as whole
Pe	80	פ			p
Tsaddi	90	צ	ף 800		j soft, as s in trea-
Koph or } Quoph }	100	ק	ץ 900		[sure q or qu
Resh	200	ר			r
Shin or Sin	300	ש			s
Tau	400	ת			t

Q. What are the languages of Asia ?

A. They are as numerous almost as the nations that inhabit it....the Sanscrit, Arabic, Persian, Telinghee, Bengalee, Malabar, Malay, and Chinese are most celebrated.

Q. What is remarkable of the Sanscrit ?

A. 1. It is not permitted to be spoken but by the priests. 2. In that language all the mysteries of their religion and laws are contained. 3. It is regular, copious, harmonious, and not diffi-

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\* The letters are thus written at the ends of words.

cult to learn. 4. Its construction agrees best with the Latin language, by which it may be verbally translated without deranging the order of the words of either language.

Q. What of the Arabic?

A. It is remarkable for its copiousness and precision, and the regularity of its construction. Some learned men say it is derived from the Sanscrit.

Q. What of the Persian?

A. It bears the same distinction in Asia that the French obtains in Europe; it is the language of taste, and of the learned: it is soft, adapted to poetry, copious and beautifully regular in its construction, and may be acquired like the French for the common uses of life in a very short time.

Q. What of the Chinese?

A. It is a very rude and unscientific language. It partakes rather of the hieroglyphical than the alphabetical character. It requires a long portion of human life to understand any of its dialects, of which there are many. The Teling-  
hee is the language of the Hindus, the Bengalee of the province of Bengal, which is written from left to right, unlike the other Asiatic languages; the Malay is a copious, rich language, it is spoken beside in Malacca, on the greater number of the islands of the oriental archipelago.

Q. Of the modern languages which are the most useful?

A. The French has been cultivated for more than a century, and is now the most prevalent language of Europe; the German is much esteemed; the Italian is more a language of taste than of use; the Spanish is becoming very useful on account of the independence of South America.

<i>The name.</i>	<i>num.</i>	<i>form</i>	<i>finals.*</i>	<i>simls.</i>	<i>Sound or Power.</i>
Aleph	1	א			a broad, as in war
Beth	2	ב		כ	b
Gimel	3	ג		ג	g hard, as in
Daleth	4	ד		דד	d [give get
He	5	ה		הה	e as in where
Vau	6	ו		וו	u as oo, w before
Zain	7	ז			z [a vowel
Heth	8	ח		ה	h hard aspirate
Teth	9	ט		טט	th
Yod	10	י			i like ee
Caph	20	כ			k or c hard, as
Lamed	30	ל	ך 500		l [come
Mem	40	מ			m
Nun	50	נ	ם 600		n
Samech	60	ס	ף 700	ש	sh
Oin	70	ע		עע	o long, as whole
Pe	80	פ			p
Tsaddi	90	צ	ך 800		j soft, as s in trea-
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## CLASS II....LESSON III.

## OF GRAMMAR.

Q. How many parts or classes of words are received in modern grammar?

A. Ten, which are called parts of speech ; 1, Article ; 2, Noun ; 3, Verb ; 4, Adjective ; 5, Pronoun ; 6, Adverb ; 7, Participle ; 8, Conjunction ; 9, Preposition ; 10, Interjection.

Q. Will you describe them ?

A. The article is derived from the Latin *articulus* a joint. There are three of them in our language....they are *a*, *an*, and *the* ; which are placed before nouns to fix their particular or general signification, as *a* man, meaning some man ; *the* man, meaning a particular man ; *an* elephant, means some elephant ; the article *a* always precedes a consonant, *an* precedes words beginning with a vowel and the letter *h*.

2. A *noun* from *nomen*, a name, signifies a place, person, or thing, as Boston, Franklin, Wisdom, America, Women, Virtue.

Nouns are divided into proper and common.... proper, are those which belong to one place, person, or thing only, as Philadelphia, Rittenhouse, Schuylkill ; these proper nouns require no article before them ; common nouns do, as book, man, river ; proper nouns make sense alone, as Europe, war, misery ; Pennsylvania, freedom, peace, happiness.

## CASES OF NOUNS.

Nouns have two cases.

The nominative case names and goes before the verb ; answering to the question....Who ? or

What? as *Who* loves truth? Benjamin loves truth? What is most commendable? Virtue.

The genitive, which denotes possession, and ought to be called the possessive case, answers the question whose? the sign is *of*, and is sometimes formed by adding an apostrophe with an s, as

This is my brother's book—instead of my brother *his* book, or the book *of* my brother.

When a noun ends in *y*, the plural is sometimes changed to *ies*....as, is the lady gone? Are the ladies gone? We were exposed to some inconveniency....we were exposed to many inconveniencies.

An apostrophe distinguishes the genitive singular, from the nominative plural, as this is my sister's nosegay.

When the nominative plural ends in s, the genitive plural is formed by adding the apostrophe after the s, as these are my two sisters' books.

3. A verb, is a word signifying action, to be, to do, or to suffer ; any word is a verb to which a pronoun being prefixed, sense is expressed....

## EXAMPLES

*Pronoun.**Verb.*

I

write.

You

read.

He

talks.

Ye

sing.

They

laugh.

<i>Article.</i>	<i>Noun.</i>	<i>Verb.</i>	<i>Adjective.</i>
a	man	is	thoughtful.
the	women	are	beautiful.
the	children	look	healthy.
an	horse	is	useful.
an	elephant	appears	large.

4. An adjective, signifies something adjoined or characteristic of the quality of a thing, place, or person; as, the river is *clear*; the man is *wise*; the city is *beautiful*; or, a *wise* man, a *clear* river, a *beautiful* city....adjectives have no sense alone, as a *wise*, a *clear*, a *beautiful*, would express no perfect idea.

Examples of Articles, Nouns, and Adjectives :

<i>Article.</i>	<i>Adjective.</i>	<i>Noun.</i>
a	plentiful	harvest.
a	free	people.
an	independent	republic.
an	happy	country.
the	good	man.
the	wise	magistrate.

Adjectives have three degrees of comparison, the positive, comparative, and superlative....as

<i>Pos.</i>	A wise magistrate ;	A good man.
<i>Comp.</i>	A wiser magistrate ;	A better man.
<i>Sup.</i>	The wisest magistrate ;	The best man.

5. A pronoun, a word used instead of a noun, to avoid the frequent repetition of names, and to abbreviate speaking and writing.

Speaking of myself, it is shorter to say *I* did so, than *William* did so. I do not say *Richard*

rose, but *he* rose ; I do not say I love Elizabeth and I teach Elizabeth, but I love and teach *her*. Here *I*, *he* and *her*, are pronouns. This part of speech has, beside a singular and plural, three distinct species ; that is the *personal*, *relative*, and *demonstrative*, very necessary to be understood.

*Relative pronouns* are those that relate to a noun which has preceded or is to follow, they are, *who*, *which*, *what*, *whether*.

*Demonstrative pronouns* are....*this*, *that*, *other*, and *same*.

*This* in the singular makes *these* in the plural. *That* in the singular makes *those* in the plural.

*Which* is also a pronoun, when things are spoken of, and *who* and *whom* when person is referred to, as

FRANKLIN was the man *who* brought lightning from the heavens.

JEFFERSON is the man *whom* the people have honored.

The 4th of July, 1776, is the day from *which* we date our independence as a nation.

#### GENDERS OF PRONOUNS.

Pronouns have three genders in our language.

The masculine, or he-kind....designated by *he* or *him*.

The feminine, or she-kind....designated by *she* or *her*.

The neuter, which signify inanimate things, and are designated by the pronoun *it*.

Pronouns have two numbers, singular and plural : the singular speaks only of one person or thing ; the plural speaks of more than one

person or thing. Each number has also three persons.

## SINGULAR NUMBER.

The first person speaks of myself,	<i>I,</i>	<i>me.</i>
The second is spoken to,	<i>thou,</i>	<i>thee.</i>
The third is spoken of	<i>he,</i>	<i>him, she,</i>
	<i>her,</i>	<i>it.</i>

## PLURAL NUMBER.

First person, speaking of ourselves,	<i>we,</i>	<i>us.</i>
Second,	to others,	<i>ye, you.</i>
Third,	of others,	<i>they, them.</i>

The plural is also formed by adding an *s* to the singular....as a dollar, two dollars....an eagle, two eagles....cent, cents.

## CASES OF PRONOUNS.

A pronoun has two cases....the *nominative* going before the verb, is called the agent, and answers to the question *who?* as who teaches Elizabeth? *I* teach her. The *accusative* following, is called the object, and answers to *whom?* as whom do you say *I* teach? You answer, you teach *me*.

The accusative in this case, is also the *objective* case, because it is the object of the verb.

Examples of the cases of pronouns :

## NOMINATIVE.

*I, thou, he, she, we, ye, they, who, whoever.*

## ACCUSATIVE.

*Me, thee, him, her, us, you, thou, whom, whomsoever.*

<i>I</i> teach <i>him</i> .	<i>She</i> learns of <i>me</i> .
<i>He</i> loves <i>them</i> .	<i>They</i> love <i>us</i> .

## PERSONS OF PRONOUNS.

## NOMINATIVE.

*Singular.*

1. I,
2. thou,
3. he, she, it,

*Plural.*

- we,
- ye,
- they.

## ACCUSATIVE.

1. me,
2. thee,
3. him, or her,

- ye,
- you,
- them.

## VERB.

*Nominative.**Accusative.**Singular.*

1. I
2. thou
3. he
4. she

- revere
- regardest
- respects
- esteems

- thee.
- me.
- her.
- him.

*Plural.*

1. We
2. ye
3. they

- admire
- love
- adore

- them.
- us.
- you.

There is another class of pronouns called *possessives*, or pronouns in the *genitive* case... they are,

My, mine, our, ours ;  
 They, thine, your, yours ;  
 His, her, hers, it, its, their, theirs ;  
 Whose, one's, other's, another's.

The following have

*Singular.**Plural.*

- |                           |           |             |
|---------------------------|-----------|-------------|
| this,                     | - - - - - | these,      |
| that,                     | - - - - - | those,      |
| myself, oneself,          | - - - - - | ourselves,  |
| himself, herself, itself, | - - - - - | themselves, |
| thyself, yourself,        | - - - - - | yourselves. |

## CLASS II...LESSON IV.

## ADVERB.

6. An adverb, is a part of speech joined to a verb, to express its quality or circumstances; as adjectives are joined to nouns.

Adverbs may be joined also to adjectives, to participles, and to other adverbs.

## EXAMPLE.

	<i>verb.</i>	<i>adverb.</i>
Hartman	reads	well.
	<i>adverb.</i>	<i>adjective.</i>
He is a	truly	good boy.
	<i>adverb.</i>	<i>participle.</i>
Janus is	secretly	plotting.
	<i>adverb.</i>	<i>adverb.</i>
He feels	very	foolishly.

Adverbs, though very numerous, may be reduced to certain classes, as follow :

1. Of *Number*....as once, twice, thrice, &c.
2. *Order*...first, secondly, thirdly, lastly, and finally, &c.
3. *Place*....here, there, where, elsewhere, anywhere, every where, whither, hither, thither, upward, downward, backward, forward, thence, hence, &c. &c.
4. *Time*....(present) now, to-day.  
(past) already, before, lately, heretofore, yesterday, hitherto, long since, long ago.  
(future) to-morrow, not yet, hereafter, by and bye, instantly, presently, immediately, strait way, &c.  
(indefinitive) oft, often, soon, sometimes, seldom, lately, always, when, then, never, ever, again, &c.

5. *Quantity*....much, little, enough, &c.
6. *Manner, quality*...wisely, foolishly, justly, badly, ably, cheerfully, admirably.
7. *Doubt*....perhaps, possibly, peradventure.
8. *Affirmation*....verily, truly, yea, yes, surely, certainly, really, indeed.
9. *Negation*....nay, no, not, by no means.
10. *Interrogation*....how, why, wherefore.
11. *Comparison*....more, most, good, better, best, bad, worse, worst, less, least, almost, little, &c.

## PARTICIPLE.

7. A participle is a certain form of the verb, participating of the properties of the adjective ...of which there are three kinds. 1. The present, or active ; 2, the perfect or passive ; 3, the compound perfect.

## EXAMPLES.

Active participle,	- - -	loving
Perfect,	- - -	loved
Compound or preterperfect,	- - -	having loved

The first signifies action, either going on, or imperfectly begun and not ended....as *I am writing*.

The second or perfect, implies that the thing is done or finished....as *it is written*.

The third....*I had written*.

There are two participles which pertain to most verbs: the first is called the active, which always ends in *ing*: the second, the *active passive*, which generally ends with *ed*: thus, *calling*, and *called*, point out the distinction; the participles are, however, more various in their terminations and forms.



## CLASS II...LESSON V.

## OF CONJUNCTIONS.

8. *Conjunctions*, or connectives, join words or sentences together.

In some cases, adverbs, participles, and pronouns, assume the character of conjunctions.

Uniform conjunctions, are as follow :

and	nor	else	because	albeit	therefore
but	tho'	either	altho'	however	thereupon
of	yet	neither	unless	namely	whatever
					whereas

Adverbs which are sometimes conjunctions,

also	then	otherwise
as	twice	likewise

Verbs that are sometimes conjunctions,

except	save
--------	------

Preposition sometimes a conjunction....for

Pronoun that

A conjunction has no separate meaning ; like an adjective, it requires another word to make sense ; *and* and *but*, for example, have no meaning ; but when thus used, are of importance.... that man *and* horse....not the man *but* the horse.

In the following sentence, the use of conjunctions is seen :

Truth *and* probity, *unless* misrepresented, command love *and* respect ; *because* these qualities are the basis of morality and virtue, *for* (or *since*, or *because*,) without them *neither* confidence *nor* mutual respect could exist in society.

## OF PREPOSITIONS.

9. Prepositions are words placed before *nouns* and *pronouns*, to shew the relation of persons, places, or things, to each other ; but like adjectives and adverbs, have no single signification.

The prepositions are,

about	before	for	out	along
above	behind	from	to	outside
after	below	in	than	with
against	beneath	into	under	inside
amidst	between	of	over	within
among	beyond	off	unto	without
amongst	by	on	towards	upon
at				

To understand the use of the preposition, omit it in the following sentences, and afterwards insert it where the dot stands between.

My father is gone . Boston

My brother is . the country.

My sister was . Trenton.

Here it is only necessary to add the prepositions....*to*....*in*....and *at*, to make sense of the sentences.

## OF INTERJECTIONS.

10. An *interjection* is a word which has no necessary connexion with, or dependence on any other....it may be singly expressed, or precede sentences explanatory of the emotion of joy, applause, sorrow, pain, contempt, or sympathy, which excited it: it is a simple exclamation, of which the following are examples :

Hazza !	bravo !	ah !	O !
Oh !	psha !	alas !	

## CLASS II...LESSON VI.

## OF PARSING.

Parsing is that part of instruction, which by practice, exercises the skill of the pupil in the parts of speech ; and by which the parts of speech are discriminated in the structure of language, according to the received rules of grammar.

## EXAMPLE.

The little birds sing praises to God, when they warble sweetly in the green shades of the wilderness.

The	-	-	-	-	an	article
little	-	-	-	-	-	adjective
birds	-	-	-	-	-	noun
sing	-	-	-	-	-	verb
praises	-	-	-	-	-	noun
to	-	-	-	-	-	preposition
God	-	-	-	-	-	noun
when	-	-	-	-	-	adverb
they	-	-	-	-	-	pronoun
warble	-	-	-	-	-	verb
sweetly	-	-	-	-	-	adverb
in	-	-	-	-	-	preposition
the	-	-	-	-	-	article
green	-	-	-	-	-	adjective
shades	-	-	-	-	-	noun
of	-	-	-	-	-	preposition
the	-	-	-	-	-	article
wilderness	-	-	-	-	-	noun

## MODES OR MOODS.

The modes or moods are four ; that is, there are four manners or ways, in which verbs express their meaning.

1. The *indicative*, which asks or declares a question ; as *I am* well ; *is* Sidney sick ; *are* you going ?

2. The *imperative*, commands or forbids ; as *learn* your lesson ; *go* up stairs ; *stop* a while.

3. The *subjunctive*, is so called, because it has often a conjunction subjoined ; as *if* I stay.

4. The *infinitive*, which has neither number, person, nor nominative case before it, and is known by the sign *to* : as *I mean to* ride ; you wish *to* walk.

#### THE TENSES.

There are six *tenses*, or distinctions of time, in which all actions *have been*, *are*, or *may be* performed ; and verbs denote action ; these are past time, present, and future, and the divisions which are made of the past and future.

The past is divided into three.

1. The *preterimperfect*, or what had not been fully done at a past time ; known by *was* ; or *did* ; or *I wrote*, *did* write, or *was* writing.

2. The *preterperfect* or what had been fully done at a time past ; known by *have* ; as *I have* been, or *have* written.

3. The *preterpluperfect* denotes time more than past, or where the date is not certainly fixed or expressed, and is known by *had* ; as *I had* written, *I had* some remote knowlege ; *I once had* an excellent horse.

The present tense has no variety, as it denotes the time that now is : the signs are *do*, and *am*, and *is* ; as *I do* write ; *I am* writing ; he *is* writing.

The future has two divisions.

1. *Future imperfect*, or time to come, known by *shall* or *will*.

2. *Future perfect*, positive, as it *shall* or *will have been*; or with the conditional or provisional *when it shall or will have been*.

Q. Is the study of grammar necessary?

A. Most certainly it is; because ignorant of the principles of grammar, we should be strangers to the correctness of the language of our own country, and unable to express ourselves on the most trifling occasions properly or correctly. What, for instance, is more common, than to hear ignorant people say, *I loves, I knows, I sees*, instead of *I love, I know, I see*; *I seen*, instead of *I saw*, or *had seen*; and *had have*, instead of *have had*; and committing a thousand other errors against grammar.

Q. Is not the study of grammar difficult?

A. In Greek and Latin it is difficult, because these languages are not spoken in common; but in the French and some other modern languages it is easy. English is very easy to us who speak it in common; but to foreigners very difficult.

Q. What is punctuation?

A. Punctuation is the art of making in writing the several pauses or rests between sentences, and the part of sentences, according to the proper quantity, or the sense of the subject.

Q. What marks are used for this purpose?

A. The comma	}	Marked thus	{	,
The semicolon				;
The colon				:
The period				.
The interrogation				?
The exclamation				!
The parenthesis				()

Q. How are these points or stops used ?

A. Each of the first four, have a power or value proportionate to their position ; as the comma is the smallest or shortest pause ; or, that which marks the sense, in places where delicacy of judgment is required, to render the intention of the writer perfectly understood. A comma before and after a word, in many instances totally alters the sense, as in the following verses :

#### FALSE PUNCTUATION.

Now Phaeton by lofty hopes, possess'd  
The burning seat, with joyful vigor, press'd  
With nimble hands the heavy reins, he weigh'd  
And thanks displeasing to his father paid.

#### TRUE PUNCTUATION.

Now Phaeton, by lofty hopes possess'd;  
The burning seat with joyful vigor press'd ;  
With nimble hands the heavy reins he weigh'd,  
And thanks displeasing to his father paid.

OVID.

The semicolon divides sentences, as the comma divides words and regulates sense ; and the colon divides sentences which are more remotely connected. The following is an example of a semicolon in an expression of Franklin.

It seems to be intended that we should see and hear twice as much as we speak ; for we have two eyes and two ears, and but one mouth.

The colon is somewhat longer than a semicolon and shorter than a period ; and in some instances where the colon occurs, the sense is perfect without what follows it, and it is then only an additional idea or sentence.

In adversity, education is a source of comfort ; in youth an amusement ; a delight in old age : at home it is agreeable ; abroad a charming companion : the fruits of a good education are always in bloom.

The period or full point, is used also to divide the members of subjects and sentences ; and to point out where a pause may take place, or a sentence ends.

The apostrophe is seen as used in poetry in the above verses, where it stands in the place of the *e*. Its further use is described in the 3d lesson, page 31, in explaining the genetive or possessive case.

The interrogation is placed after questions.

The exclamation, or note of admiration, is placed after words or sentences which express surprize or admiration; and when used in satirical or humorous exclamations, two or more of them are often used.

Parenthesis are used for the introduction of small sentences into the middle of larger.

A moral life is the happiest; there is no religion (however often you go to church) without a moral conduct; moral conduct is practical religion; religion without morals (it is too frequent) is only imposture or hypocrisy.

There are various other signs used in writing and printing, among which are the following:

The apostrophe ' is used as a means of abbreviation, as tho' for though; receiv'd for received, Katherine's book.

¶ This sign is called paragraph, and is principally used in the scriptures to designate the commencement of a new subject.

§ This is called a section, and is used in various works for the division of subjects.

\* ‡ † || \* \* are used as references to notes frequently placed at the bottom of a page, which explain or illustrate a point, or refer to an authority for what is asserted.

## CLASS II...LESSON VH.

## OF RHETORIC AND ORATORY.

What is rhetoric ?

The art of expressing ourselves well, and mentally, on any subject ; to please, to move the passions, and to persuade, whether in speaking or writing. A speech made according to the rules of this art, is called an *oration*, and the speaker an *orator*, or an eloquent man.

What are the qualifications of a good ora-

He should have the following requisites :  
I. *A knowledge* of the subject, names, and properties of the matters to be spoken of.

II. *Memory*, which is the power of the mind to retain the things he has learnt.

III. *Invention*, by which he finds out such reasons and arguments as are adapted to persuade in belief.

IV. *Pronunciation*, which relates to the delivery of a discourse or oration in a distinct and agreeable manner ; with a pleasing modulation of voice, and becoming gesture of the body.

V. *Disposition* or *order*, that he may know how to dispose or arrange his arguments in a proper order or method.

VI. *Elocution*, which is a clear and distinct manner of expression, harmonious to the ear ; slow and deliberate as to be clearly heard and understood.

VII. A knowledge of logic, or a logical mind.  
What else is necessary to the completion of rhetoric or eloquence ?

Simplicity of style is ever the most impressive ; but as there are various modes of



eloquence, so in some a figurative language is allowed ; and indeed more of our general discourse is of the figurative kind, than may at first sight be supposed.

Q. Are figures of only one kind?

A. No ; they are divided into two classes.... *tropes* and *figures*.

Q. What are tropes and figures?

A. A *trope* is an elegant and beautiful turning of a word from its proper signification to another. As charity is *cold*.... You read *Virgil*, i. e. the writings of Virgil.... The clouds drop *fatness*, &c.

Q. What are figures?

A. Some of them regard the *meaning* of words ; as, if we *ride*, let's ride, i. e. go forward ; some depend on the *sound*, as he is not a *friend*, but a *fend* ; some refer to the *order*, as, *meats* are for the belly, not the belly for the *meats* ; some relate to the subject of actions as they change their *soil*, not their *minds*, who plough the main.

When an Indian of our woods speaks, he resorts to figures....as, " We have planted the tree of peace".... " I have buried the tomohawk, let us brighten the chain of friendship."

Q. Are there not various kinds of figures?

A. The principal figures are personification, apostrophe, comparison, metaphor, allegory ; and these have their separate classes.

Personification is the boldest of figures, as it bestows life and motion on inanimate things....

Now summer with her wanton court is gone

To revel on the south side of the world,

While winter rising pale from northern seas,

Shakes from his hoary locks the drizzling rheum.

ARMSTRONG.

Let none with heedless tongue from truth disjoin  
The reign of virtue. AKENSIDE.

Here summer, and winter, and virtue, are  
personified.

Look the morn in russet mantle clad,  
Walks o'er the dew of yon high eastern hill.  
SHAKESPEARE.

Apostrophe very much resembles the preceding figure, as it consists in bestowing ideal presence on persons dead or absent....example,

Weep on the rocks of roaring winds O maid of  
Innistore, bend thy fair head o'er the waves, thou  
fairer than the ghost of the hills when it moves in  
a sunbeam over the silence of Morven! He is  
fallen! Thy youth is low; pale beneath the sword  
of Cuchullin. OSSIAN.

The dead are also invoked in the apostrophe.

Hyperbole is a diminishing or magnifying of  
an object contrary to reality or strict truth....  
example.

"He was owner of a bit of ground not larger  
than a Lacedemonian letter."

This is a ludicrous hyperbole.

Comparison is a familiar figure....example,

The music of Carryl was like the memory of  
joys that are past, pleasant and mournful to the  
soul. OSSIAN.

Some think the spirit is apt to feed on the flesh  
like hungry wines upon raw beef. SWIFT.

Collins's ode entitled the passions, is throughout, a beautiful personification of the several  
passions.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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CLASS III....LESSON I.

OF MATHEMATICS.

Q. What is meant by mathematics?

A. The science of numbers, or quantity, magnitudes, and extension ; or whatever is capable of being numbered or measured.

Q. What is the use of mathematics ?

A. Upon this science the most sublime and interesting of all others depend....astronomy, geography, and even the ordinary transactions of business ; beside that the study opens and extends our mental faculties, strengthens and corrects our judgment, and by giving us just ideas of proportions and distances, enables us to reason accurately.

Q. What concern has it with our ordinary business ?

A. Arithmetic, which is only a branch of mathematics, renders us great service.

OF ARITHMETIC.

Q. What is arithmetic ?

A. The art of numbering, or calculating truly by simple numbers, with ease and expedition.

Q. Describe arithmetic ?

A. It consists of certain rules or modes of employing numbers in calculation ; they are addition, subtraction, multiplication, division ;

and these four rules all mathematical calculations are founded.

The operation of arithmetic is performed with certain signs or characters which represent numbers, borrowed from the nations of Asia, and never in number to the fingers on the hands... hence they have been called *digits*.

They are of the greatest antiquity in the Hindwritings; they were introduced into Europe by the Arabians or Moors, and brought into use by Pope Sylvester the Second, in place of the old tedious and confused Roman mode of notation by alphabetical letters; they are as follow :

One	-	-	-	-	-	1
Two	-	-	-	-	-	2
Three	-	-	-	-	-	3
Four	-	-	-	-	-	4
Five	-	-	-	-	-	5
Six	-	-	-	-	-	6
Seven	-	-	-	-	-	7
Eight	-	-	-	-	-	8
Nine	-	-	-	-	-	9
Cypher	-	-	-	-	-	0

The first nine of these are called significant figures, to distinguish them from the cypher, which has no value alone; but being placed on the right side of a whole number increases its value; as 1 is only a single number; and 2 double the number one; by placing a *cypher* on the right of *one*, it becomes *ten*; thus 10, means ten times one. So placing the cypher on the right of 2, thus 20, it becomes two times ten or twenty times one. Again, if any of these figures, say, 3, 4, or 5, stand alone, they mean no more than three, four, five times one;

add one cypher to them and they become ten times as many, thus 30 thirty, 40 forty, 50 fifty....so two cyphers and they become three times four times ten ; as 300 three hundred, 400 hundred, &c. and the same power encrease ten fold proportion with every figure which is significant or cyphers ; as will be seen in following tables.

1	Units	1
12	Tens	10
123	Hundreds	100
1234	Thousands	1000
12345	Tens of Thousands	10000
123456	Hundreds of Thousands	100000
1234567	Millions	1000000
12345678	Tens of Millions	10000000
123456789	Hundreds of Millions	100000000

To read figures with facility, the words expressing the numbers should be first got by heart....as units, tens, &c.

The figure farthest at the right hand expresses that number of units, and the second from the right hand tens, and the third hundreds, so on.

So begin at the first table, the first number being only one, you can proceed no farther.

The second number is 12, that is beginning at the right....2 units, and one ten, that is twenty times one.

The next number is 123 ; that is beginning on the right, three units, and two tens, which make twenty and three ; and the third figure from the right, being in the place of hundreds is one hundred ; that is three units, two tens and one hundred, or one hundred and twenty three times one.

The following are the examples :

- 76 Seven tens and six, or seventy six.  
1776 One thousand seven hundred and seventy  
six.  
550 Five hundred and fifty.  
52407 Fifty two thousand four hundred and  
seven.

After acquiring the art of enumeration or declaring the numbers properly, the next step in arithmetic is that of

## CLASS III....LESSON II.

## ADDITION,

Or the rule for adding two or more numbers together, and discovering the amount of the whole in one sum.

The first principle of addition is, that the figures must be set under each other in their order, as units, tens, hundreds, &c. and if there are several sums to be added of unequal amount, the order must be from the right ; as in the following examples :

I have one cent, a quarter dollar which is twenty five cents, and a dollar which is 100 cents, how must they stand to be added together, so as to find out the whole amount? Place the unit or one cent first as follows :

One cent	-	-	-	1 cent.
Quarter Dollar, tens.	-	-	-	25 cents.
Dollar, hundreds,	-	-	-	100 hundred cents.
				126
				126

The numbers added together give one hundred and 26 cents ; the same course is to be pursued with any other numbers, as in the following examples :

20	75	122	43568
4	1430	71	3
2237	1	3	19
2261	1506	196	43590

Care must be taken to avoid the vulgar mode of expression, as two and three *is* five ; four and five *is* nine ; *are* must be used in place of *is*.

If Elizabeth be possessed of 20 cherries, and Richard of 50, and Sidney of 2, how many have they all got, added together?

Elizabeth's share,	-	-	20
Richard's	-	-	50
Sidney's	-	-	2

Answer,	72
---------	----

The manner in which these are added, ought to be repeated by the learner, as in the following examples :

2 Two	10 Ten
7 and seven	9 and nine
—	—
9 are nine.	19 are nineteen
—	—

4 Four	11 Eleven
3 and three are seven	1 and one are twelve
6 and six are thirteen	2 and two are fourteen.
7 and seven	9 and nine
—	—
20 are twenty.	23 are twenty-three.

When larger numbers are to be added, it is proper to know why the surplus over the first digit or figure, is carried to the next computation....for this purpose the following examples are given :

Add together the following numbers :



	5974
	9803
	7541
	862
	<hr/>
Product of Units	. . 10
. . . Tens	. . 17 .
. . . Hundreds	. 30 . .
. . . Thousands	21 . . .
	<hr/>
	24180

You begin with 2 and 1 are 3, and 3 are 6, and 4 are 10 ; in common practice it is usual to say nought and carry one, and then to say 1 and 6 are 7, and so on, in the second column.

To explain this, set down the product of each addition as above ; and the product 10 will be under tens ; 17 under hundreds ; and so forth ; the usual way of carrying the sum to the next column or term is for brevity ; the nature of which is here explained. The dots may be used until the pupil is expert.

Addition of numbers of various denominations next follows ; as for example....

I have three sums of money, ; I wish to know the whole amount. I first set down the dollars, and then knowing that a quarter of a dollar is 25 cents, and half a dollar 50, I set the cents to the right of the dollars as follows :

120 and 25 cents.	
62	50 or half a dollar.
22.	75 or three quarters.
<hr/>	<hr/>
205	80

I add the cents together, and find the sum to be 20550 cents, or 205 dollars and fifty cents.

## SUBTRACTION.

The second rule of Arithmetic is subtraction, which teaches how to take from a large number a smaller, and to determine exactly what remains.

In this rule, the figures must be placed in the same order as in addition, units under units, and so on....a line is then drawn under the second number, and beginning with the figure on the right of the lower line, you proceed as in this question.

Edward has cherries	50
Elizabeth only	20

What is the difference ? Amount.	30
----------------------------------	----

That is Elizabeth had 30 less than Edward.

Benjamin had 53 marbles, of which Richard borrowed 14, how many remain with Benjamin?

Here the question must be stated as before.

Benjamin's marbles	53
Richard borrowed	14

How many remain ? Answer.	39
---------------------------	----

This subtraction presents the first difficulty, beginning with *four*, you say, 4 from 3, I can't, but (adding *ten* to the three, which makes thirteen) 4 from 13 and 9 remains; and the figure of 9 is set down in the proper place.

Having borrowed ten from the preceding number, in order to deduct, you now carry it back and say, carrying one to one, are two....2.

from 5 and three remain ; you then set down 3 to the left of 9, which gives the sum of 39 left.

Again ; Margaret borrowed from her sister Anastasia

	413 pins ;
And pays in part,	239 How many are
due to Anastasia ?	<u>          </u>
Answer,	174

The course is the same with the figures 9 and 3, as before with the 4 ; 9 cannot be deducted from 3, so ten are added to make 13, from which you deduct 4, carrying one to the three for that borrowed ; you say carry one to three are four, from one I can't ; (you must therefore borrow *ten* as before, which added to one make eleven ;) but 4 from 11 and seven remain ; you then carry one to the figure 2, and say, 1 and 2 are three, which deducted from 4 leave 1 ; then setting down the 1, the whole sum of 174 is shewn.

Subtraction of various numbers comes next... example,

I have lent William 300 dollars, of which he has paid me 10, 15, 62 and 11 dollars...How much remains due ?

I first add those small sums together thus, and then place the amount.

Add {	10	Subtract.	{	Lent	300 dollars.	●
	15			Paid	98	
	62					
	11					
	<u>          </u>			Now due	<u>202 dollars.</u>	
	98 paid me.					

## CLASS III....LESSON III.

## MULTIPLICATION,

Is the third rule of arithmetic, it is but a short method of addition ; thus the multiplication of by 5, is only shortening the trouble of setting down the number 5 four times and adding them together ; but in large numbers the use is very neat and saves great labor.

To use this rule properly, the following table must be got by heart :

MULTIPLICATION TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

The number to be multiplied is placed over it by which it is to be multiplied. As if I want to know how many books altogether there are in 172 sets of Hume's History of England, I ask how many volumes in one set, the answer is

eight volumes....then I must set down the number of sets....

	172 sets of Hume's History,
Multiply by	8 volumes in a set,

The whole,	1376 thirteen hundred and seventy six volumes.
------------	---

The use of this rule is not confined to the multiplication of single numbers ; but may be used for ascertaining the compound amount of any numbers multiplied by others. When the multiplier consists of two, three, or more figures, or cyphers, the first figure must, as in the preceding rules, be set down the same way, as in the following sum :

There are in an orchard in Jersey, 274 trees in one row, and there are 45 rows, each of the same number, how many trees are in the orchard ?

Multiplicand	274 trees in each row
Multiplier	45 rows

First product	1370 if there were only five rows this would be the amount.
---------------	--

2d product	1096 if forty rows this amount.
------------	---------------------------------

Total	12330
-------	-------

The reason for placing the first figure of the second product, under the first figure of the first product, is that it is the product of the tens.... the figure 4 of the 45 holding the place of the tens or 40 ; so if there were three figures in the multiplier, the product of the third should come under the hundreds.

*other example....* There are upwards of seven  
ns of persons in the United States....if each  
contribute annually 150 cents, how much  
amount to ?

Population,	7,000,000
Contribution,	150 cents.
	<hr/>
	3500000   00
	7000000   ..
	<hr/>
Answer,	10,500,000   00 cents.
	<hr/>

the same method of placing dots or cyphers  
copy the places of tens, hundreds, &c. as is  
on, would be particularly useful in learning  
rule....example.

na there are towns and cities 16504  
ge houses in each 1463

many houses ?	... 49512 units
	.. 99024 . tens
	. 66016 .. hunds.
	16504 ... thous.
	<hr/>

number houses,	24145352
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## CLASS III...LESSON IV.

## DIVISION,

Is the last of the four fundamental rules of arithmetic, or upon which rules all others depend. It is the rule by which is found how many of any smaller given numbers are contained in a greater, and the overplus.

There are three descriptions of numbers concerned in division....the dividend, or sum to be divided....the divisor, or lesser sum, which the dividend is to be divided by....and the quotient, or result....take the following examples :

I have 1376 volumes of Hume's history of England, which I wish to divide into sets.....each set contains 8 volumes, how many sets have I?

	Dividend.
Divisor 8 )	1376 ( 172 Quotient.
	.8
	<hr style="width: 50px; margin-left: 0;"/>
	.57
	.56
	<hr style="width: 50px; margin-left: 0;"/>
	.. 16
	.. 16
	<hr style="width: 50px; margin-left: 0;"/>

When the first figure on the left of the dividend is greater than the divisor, (for example, if it were 9) place the divisor under that figure ; but when it is greater as above, place it under the second figure, and say eight into thirteen *once*, 8 from 13, five remain, place one to the quotient ; then bring down to the right of this remainder the next figure 7, and by your multiplication table you will count how many times 8

80 into 57 ; for 7 times 8 are 56 :....then place 7 to the quotient and set 56 under the 57, and subtract, and the remainder is one ; bring down the next figure of the dividend, and place it to the right of the remainder, and it makes sixteen ; then say 8 into sixteen twice, and place 2 o the quotient and no remainder being left.... the quotient, shews that the number of sets of volumes is 172.

## OF PROPORTIONS.

## Coins, Weights, Measures.

Engle.	Half Eagle.	Dollar.	Dimes.	Cents.	Mills.
1	= 2	= 10	= 100	= 1000	= 10000
	1	= 5	= 50	= 500	= 5000
		1	= 10	= 100	= 1000
				1	= 10

Dollars, cents, and mills alone should be noted in accounts.

## TROY WEIGHT.

Sound.	Ounces.	Penny wts.	Grains.
1	= 12	= 240	= 5760
	1	= 20	= 480
		1	= 24

## APOTHECARIES' WEIGHT.

Sound.	Ounces.	Drams.	Scruples.	Grains.
1	= 12	= 96	= 218	= 5760
	1	= 8	= 24	= 280
		1	= 3	= 60
			1	= 20

These two weights vary only in the division into drams and scruples by the apothecaries, who only use this weight in compounding medicines; they buy by averdupoise and sell by troy weight. Troy weight is used in the purchase and sale of jewellery, gold and silver and jewels. One grain of Troy weight is supposed to weigh a grain and a half of sound dry wheat.



## AYERDUPOISE WEIGHT.

Ton.	Hundred.	Quarter.	Pounds.	Ounces.	Drams.
1 =	20 =	80 =	2240 =	55840 =	573440
	1 =	4 =	112 =	1792 =	28672
		1 =	28 =	448 =	7168
			1 =	16 =	256
				1 =	16

By this measure is weighed all grocery and other heavy goods, excepting precious metals, jewels, &c.

## TROY WEIGHT.

	oz.	dwt.	gr.
1 pound averdupoise makes,			
Troy weight	14 +	11 +	15½
1 ounce		18 +	5½
1 dram		1 +	0½

## LONG MEASURE.

Mile.	Furlongs.	Poles or Perches.	Yards.	Feet.	Inches.
1 =	8 =	230 =	1760 =	520 =	63360
	1 =	40 =	220 =	660 =	7920
		1 =	5½ =	16½ =	198
			1 =	3 =	36
				1 =	12

An inch is supposed to be the length of three grains of barley.

Four inches....a hand.

Six feet, or two yards....a fathom.

Three miles....a league.

Sixty nautical or geographical miles a degree, or about 69½ of our common miles.

## CLOTH MEASURE.

Yard.	Quarters.	Nails.	Inch
1 =	4 =	16 =	36
	1 =	4 =	9
		1 =	2½

3 quarters 1 Ell Flemish

5 quarters 1 Ell English

6 quarters 1 Ell French

## LAND OR SQUARE MEASURE.

Acre.	Roods.	Sq. Poles.	Sq. Yds.	Sq. Feet.	Sq. Inches.
1	= 4	= 43	= 5840	= 43560	= 6272640
	1	= 40	= 1210	= 17898	= 1568160
		1	= $30\frac{1}{4}$	= $272\frac{1}{2}$	= 49204
			1	= 9	= 1296
				1	= 144

## WINE MEASURE.

Ton.	Pipe or Butt.	Punchcon.	Hhd.	Gallons.	Pints.
1	= 2	= 3	= 4	= 252	= 2016
	1	= $1\frac{1}{2}$	= 2	= 126	= 1008
		1	= $1\frac{1}{3}$	= 84	= 672
				63	= 504
				1	= 8

231 cubic inches....a gallon.

10 gallons, an anker.

18 gallons, a mudlet.

$31\frac{1}{3}$  gallons, a barrel.

By this measure, wine, brandy, cyder, mead, vinegar, oil, and honey, are measured.

The ale and beer measure differs from the wine measure in the cubic measure of the gallon, and contains 51 cubic inches more, or 212 cubic inches.

Hhd.	Barrel.	Kilder.	Firkin.	Gallons.	Pints.
1	= $1\frac{1}{2}$	= 3	= 6	= 51	= 408
	1	= 2	= 4	= 34	= 272
		1	= 2	= 17	= 136
			1	= $8\frac{1}{2}$	= 68
				1	= 8

## DRY MEASURE.

The gallon dry measure contains  $268\frac{5}{8}$  cubic inches.

East.	Ways.	Qrs.	Comb.	Bush.	Pecka.	Gallons.	Pints.							
1	=	2	=	10	=	20	=	80	=	320	=	640	=	120
		1	=	5	=	10	=	40	=	180	=	320	=	2560
				1	=	2	=	8	=	32	=	64	=	512
						1	=	4	=	16	=	32	=	256
								1	=	4	=	8	=	64
										1	=	2	=	16
												1	=	8

By this measure all dry wares, such as corn, seeds, fruits, roots, sand, salt, coals, &c. are measured.

TIME.									
Month.		Weeks.		Days.		Hours.		Minutes.	
1	=	4	=	28	=	672	=	40320	
		1	=	7	=	168	=	10080	
				1	=	24	=	1440	
						1	=	60	

This distribution of time is not exactly conformable to the calendar, for the solar and lunar month both differ from it; but it approaches nearest the lunar. The solar time is calculated by this proportion of parts, but the time of the calendar alters the term months, according to the following old verse :

Thirty days hath September,  
 April, June, and November;  
 February alone hath eight and a score,  
 But ev'ry leap year gains one more.

The calendar year has 52 weeks, which is four weeks more than the computation by months of 28 days....this is explained in the lessons on astronomy and chronology.

#### OF NUMERICAL LETTERS.

2. What were those figures mentioned as in use, before the present figures in arithmetic were-brought from Asia to Europe?

A. The Hebrews, Greeks, and Romans, used the letters of their alphabet for numbers ; the Roman numeral letters were in use in Europe.

Q. As those numerals are still found on watches, clocks, and frequently in the titles of books, and in ancient monuments, they ought to be known ; describe them.

A. They are as follow :

I	signifies	-	-	-	1
V	-	-	-	-	5
X	-	-	-	-	10
L	-	-	-	-	50
C	-	-	-	-	100
CC	-	-	-	-	200
D	-	-	-	-	500
M	-	-	-	-	1000

To explain this mode of enumeration, a course is pursued not necessary with Asiatic numerals. To express the number two, three or four, in the Asiatic, we write 2, 3, 4 ; but in the Roman, we must write II. III. IV. In this number the figure or letter L. placed to the left of that which represents five, reduces it to four, and placed to the right thus VI. increases it to six....the same practice is pursued with IX. which makes it one less than ten or X....and with other numbers, for example : the letter L represents 50....to express 40, that is 10 less, the letter X is placed before the L thus, XL....change the position of the X to the other side thus, LX. and it represents sixty. The rule for determining by the position of these letters, is when a sign or letter of less value stands before a greater, the greater is so much diminished ; when a sign or letter of less value stands after a greater sign, the value is so much increased ; as in the following examples :

DIMINISHED.		ENCREASED.	
IV four	4	VI six	6
IX nine	9	XI eleven	11
LX forty	40	LX sixty	60
XC ninety	90	CX one hund. & ten	110
CD four hundred	400	DC six hundred	600

M,DCC,LXXVI expresses the date of American independence.

M	being one thousand	-	-	-	1000
D	five hundred	-	-	-	500
C	one hundred	-	-	-	100
C	one hundred	-	-	-	100
L	fifty	-	-	-	50
X	ten	-	-	-	10
X	ten	-	-	-	10
V	five	-	-	-	5
I	one	-	-	-	1

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1776

The preference given to the oriental figures, may be better understood by attempting to state a sum in addition in the Roman numerals.

## CLASS III...LESSON VI.

## GEOMETRY.

Q. What is geometry?

A. A science teaching the mensuration of quantity in all its extents, length, breadth, and thickness.

Q. What is the meaning of the word geometry?

A. It is derived from the Greek, and signifies the art of measuring the earth. It is supposed to have had its rise among the Egyptians, who were compelled to invent it, to remedy the disorders occasioned in their lands by the annual overflowings of the river Nile, which defaced every boundary.

Q. How is quantity distinguished?

A. It is like other science for simplicity, divided into lines, superficies, and solids.

Q. What is a line?

A. A line is formed by the motion of a point; and therefore is one dimension only, i. e. length.

Q. How is a superfice generated?

A. By the motion of a line, and so hath three dimensions, length, breadth, and thickness.

Q. How is geometry applied?

A. Into three principal parts.

1. *Altimetry*, which is applied to the measuring all heights, accessible or inaccessible.
2. *Planimetry*, which teaches the mensuration of planes or surfaces in square measures, such as square miles, yards, feet, inches, &c. as land surveying.
3. *Stereometry*, which is the mensuration of all kinds of solid bodies, in solid or cubic mea-

asures, as cubic feet, cubic inches, &c. This also includes *guaging*, or the art of finding the contents of any cask or vessel, or the quantity of liquor contained in them....also timber measure, superficial and solid.

#### MECHANICS.

Q. What is the proper signification of mechanics?

A. It is that science which teaches the nature and laws of motion, the action and force of moving bodies; and the construction and effects of all those machines and engines which go by the name of mechanic powers.

Q. What is motion?

A. A continual and successive change of place.

Q. What is rest?

A. The continuance of the body in the same place for any time.

Q. Pray explain what is meant by a mechanic power?

A. Any machine or engine by which a man can raise a greater weight, or overcome a greater resistance than he could do by his natural strength without it, is called a mechanical power.

Q. How many mechanic powers are there?

A. They are said to be six in number....namely, the *lever*, by which we lift weights much greater than our strength, unassisted, could overcome: the *axle* and *wheel*, by which we can lift them to greater heights: the *pulley* lifts them higher still: the *screw*, which, if it could move without friction, would give a greater force than any of the rest: the *wedge* used in cleaving wood, &c. and the *inclined plane*, by which hea-

vy bodies are rolled up with greater ease. And of these all the most useful compound engines now consist ; as clocks, watches, orreries, mills, most sorts of water engines, and an infinite number of others.

#### OF AGRICULTURE.

Q. What is agriculture ?

A. It is the art of cultivating the earth ; and consists, like all other arts, of theory and practice. The practice of agriculture is the mere ploughing or digging up the soil, sowing the grain or vegetable seed, and gathering it when ripe ; and this may be done well by a strict imitation of what has been before done.

Q. What is the theory of agriculture ?

A. It is properly a science, and comprehends enquiries into the nature and properties of bodies, such as earths, minerals, salts, fluids, vegetation, and the causes of the operations of nature by these agents, and is properly connected with geology, mines, botany, alogy, and chemistry, which all farmers should study....the skilful agriculturalist is called a husbandman, and his art husbandry.

Q. How do the other sciences promote agriculture ?

A. By making men better acquainted with the faculties and properties of natural bodies.

The study of chemistry teaches the nature of the various kinds of earth, the effects of different manures by which soil is fertilized. Botany teaches the food of plants ; the vegetables fitted to particular soils ; the modes of guarding against danger to his crops, and the diseases and insects which injure them. The knowlege



Q. What are the most esteemed paintings?

A. Those representing historical events.

Q. How many modes of painting are there?

A. Five: 1. in oil; 2. in fresco; 3. in water colors; 4. on glass; and 5. in enamel; to which may be added, miniature and pastel. Painting in oil was unknown to the ancients. The art has received the greatest advantage from this discovery.

Q. What are the qualifications of an excellent painter?

A. He ought to understand mathematics and the laws of proportion, the anatomy of all animals, and no science should be strange to him; and drawing in its highest perfection.— He ought to have a perfect knowledge of anatomy and geometry. He ought to be conversant in history and other sciences, and to have great judgment and patience: to be sober, and fond of his art.

#### SCULPTURE.

Q. What is sculpture?

A. The art of carving or hewing stone or metal into images. Every thing that is engraved or worked in relievo, makes a part of this art.

Its antiquity appears from many places of the holy scripture....from the idols of Laban, which Rachael carried off, and from the golden calf set up by the Israelites in the desert.

#### COMMERCE.

Q. What is commerce?

A. The art of exchanging one thing for another, or buying or selling merchandize, &c. with an intention to gain.

**Q.** Has commerce been a long time invented?

**A.** Men could not exist in society without it, and therefore it must be coeval with society, and as ancient as mankind. At first it consisted in nothing more than the exchange of things necessary for life, as it is at present practised on the coasts of *Siberia*, *Norwegian Lapland*, and *Russian Lapland*....amongst many nations of *Africa*, and *Asia*, and almost all the Indian nations of *America*.

**Q.** Was money, which we find of such infinite use in commerce, known in early ages?

**A.** The term early ages is very indefinite; besides, we know very little with certainty, of what is called the early ages; we know that money, as a means of exchange, was current in *Asia*, many ages before the history of the *Hebrews*, *Greeks*, and *Romans*; and we know that it was common among all the ancient commercial nations, and that at *Tyre*, and *Rhodes*, and *Carthage*, and *Athens*, they had not only coined money, but also had insurance offices and usurers.

**Q.** What nations have made themselves most famous by their commerce?

**A.** The *Phenicians*, *Egyptians*, *Carthaginians*, *Athenians*, *Rhodians*, *Romans*, *Gauls*, and *Flemings*....afterwards the *Venetians*, *Genoese*, *Pisans*, *Etrurians*, and *Dutch*: the *Dutch* rose upon the fall of the *Hansetowns*; and the *British* overwhelmed the *Dutch*, and became the merchants of the universe; they have carried on the most extensive commerce in the world. Next to *England*, the *United States* have carried on the most extensive commerce.

Q. To what cause was the extension and facility of commerce principally to be attributed?

A. To the discovery of the principle of the magnet, and the invention of the mariners compass; the art of printing gave it new force.

Q. What is the principle of the magnet?

A. It is a quality in magnets, which always points in one direction, that is to the north....by which means it could be known on board a ship out of sight of land in the darkest night, in what direction she was sailing.

Q. What were those towns you call the Hanse towns?

A. They consisted of an association of cities and towns in different parts of Europe, which formed a confederation for the purpose of carrying on trade, and protecting each other against pirates: the name is derived from *hansa* a league or confederation. They commenced with Lubec and Hamburg in 1109.

The Hanse towns consisted of 72 European cities, among which were Lubec, Hamburg, Rostoc, Stralsund, Wismar, Crypswald, Anclam, Stetin, Colberg, Stolpe, Dantzic, Elbing, Koningsburg, Amsterdam, Antwerp, Rotterdam, Bruges, Ostend, Dunkirk, Middleburg, Calais, Rouen, Bordeaux, St. Malo, Bayonne, Bilboa, Lisbon, Seville, Cadiz, Carthage, Barcelona, Marseilles, Leghorn, Naples, Messina, London, &c.

Q. What is the state of the Hanse towns at this time?

A. They were reduced to four prior to the French revolution; that is, Hamburg, Bremen, Lubec, and Dantzic....Prussia seized on the latter after partitioning Poland....but in 1810, they were all annexed to the French empire.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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CLASS IV....LESSON I.

OF CHRONOLOGY, OR THE DIVISION OF TIME.

"A little chronology will be highly useful."

KNOW

Q. WHAT is chronology ?

A. A science that teaches the method of measuring time, and distinguishing the periods of history and dates of great events : literally, it is a discourse concerning time : as it is applied, it is the measure of time, in relation to human affairs or events ; so that the precise point of time, at which any two or more events have occurred, may be so accurately known, as not to be confounded with either, or any other ; and in this view it is considered as one of the eyes of history.

Q. What is time ?

A. Time is the duration of existence ; its parts are centuries, years, months, weeks, days, hours, minutes, seconds, &c. and by these the larger and less intervals of time are estimated and measured.

Q. Are there not many modes of dividing time, as into natural and artificial time ?

A. There are many which we may thus explain.... Day is while the sun illumines the horizon; night, the period during which the horizon is in darkness, from the absence of the sun.

The natural day is also that period of time in which the earth performs a single revolution of its equator.

The artificial or civil day is of various kinds, and accords with the rules or customs of those who begin and close their computation of a day at one or another period of time....some computing from the rising, and others from the setting of the sun....others from noon, and others still from midnight.

The ancient Babylonians, Persians, Syrians, and some of the Greeks, computed their day from the rising of the sun.

The Athenians, Jews, some of the Germans, the Italians, and Chinese, compute the day from the sun setting.

The Arabians, the ancient Umbri, and modern astronomers, from noon, or when the sun is in the meridian. Mariners also begin their journals at sea, and count their day's work from noon.

The Egyptians, Romans, French, Spanish, British, Batavians, some Germans, Portuguese, and the Americans, compute the day from the period when the sun is in our nadir, or in the point opposite to the zenith.

As the time of beginning the day has varied, so have the artificial proportions of the day; some dividing the whole period of the natural day into twelve parts only....some into twenty-four parts, which were counted from one to twenty-four in succession: our mode of dividing the day into two portions of twelve hours each,

most prevalent. The hours are measured by watches and clocks : the ancient Greeks, and the Hindus, measured time by an instrument called a clepsydra, which was a plate or bowl of silver, placed on the surface of a large measure of water, and which filled through an aperture at the bottom, in a certain time.

How many days are there in a year ?

Three hundred and sixty-five.

Is this number always the same ?

No ; it changes every four years, and the year, which is called Bissextile, or leap-year, has always one day more.

How comes this change ?

Every year consists of 365 hours nearly. These hours in four years amount to one whole day, which is then added at the end of February ; on this account it is said this month has twenty-nine days once in four years. This is our chronological year.

What is a month ?

A month is just the time wherein the moon goes round the earth, which revolution she performs in twenty-seven days, seven hours, and three minutes ; so that there are thirteen months in a year, and about eleven days more. However, for conveniency, and greater regularity, the months are made but twelve in our almanacs, by adding a greater number of days to each month than it really contains.

How many weeks are there in a year ?

Fifty-two.

How many days are there in a week ?

Always seven.

How are they named ?

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.

Q. Do all nations reckon them in the same order?

A. No....The Christians count from Sunday, in memory of the resurrection of Jesus Christ; the Jews from Saturday....the Mahomedans from Friday.

Q. How were the months and years regulated?

A. Among the most ancient nations the year was accounted to contain 360 days: this was the Mosaic year; but it was found by the rotation of the months, which in time fell in different seasons from those by which they were named, that the natural year contained more than this distribution. According to the records of the Hindus they first corrected the error, and had even made allowance for the precession of the equinoxes. The Egyptians, however, attributed to Hermes, the addition of five intercallary months: but even this fell short of the truth.

The Grecian year was divided into 12 synodic months, of 29 and 30 days alternately; but this made only 354 days, and was more deficient still.

The Roman year, introduced by Romulus, and reformed by Numa 670 years before Christ, was regulated by lunar months, or revolutions of the moon, and days were occasionally added to adapt the seasons to the solar year.

Julius Cæsar altered the year to 445 days, which was an excess; but Sosigines, a mathematician of Alexandria, advised a different regulation of 365 days and 6 hours, which was adopted; but as the six hours could not be noticed in civil use, he ordered them to be neglected till the fourth year, when they amounted to a day, and that year contained 366 days, which is the origin of our bissextile or *leap year*.

Q. How was this bissextile or day added to the leap year formed ?

A. By the addition of a day, which was made after the Roman feast of *Terminalia*, or the 23d of February, or the *sixth* of the calends of March (*Sextus Calendas Martii*) this day instead of being counted like our 29th of February, was ordered to be counted twice ; that is two days of the same date, 6th calends of March ; whence the origin of the word *Bissextile*, the leap year being called by that name, having two 6th or calends of March, from *bis*, twice, *sextus*, six.

Q. How did the Romans divide their month ?

A. Into calends, nones, and ides ; calling the first of every month its calends.

Q. Did the Romans reckon their months like us ?

A. No ; they had first only ten, afterwards they added two, but they always began their year at March.

Q. What is meant by new style ?

A. It was the alteration of this Julian or old style...for this system still was defective, or rather excessive by eleven minutes ; as in every 133 years it was found to amount to a whole day ; for in A. D. 325 the vernal equinox fell upon March 21st, and in 1582 it fell upon the 11th March.

Pope Gregory the XIII. undertook to correct this error, which is the origin of what is called the *new style*, and directed that the whole of the days between 11 and 21 should be suppressed, and that the 12th should be calculated as the 21st of March, and to prevent the like variation in future, he directed that in every four years terminating four centuries, the three first years shall be common and the fourth bissextile, ac-



cording to the Gregorian calculation ; whereas, according to the Julian all would be leap years. It was in conformity to the Gregorian calendar, that the year 1800, which would have been leap year, counted as an ordinary year, and that 1804 was the first leap year after 1796.

The Gregorian style was not, through prejudice, adopted in England till 1752 ; it is not adopted yet in Russia, where the days of the month are 11 days behind our dates.

Q. Are the hours equally irregular. ?

A. The most ancient hour is supposed to be equal to two of our modern hours ; that is 12 hours in a day. The Hindu hour is, however, the 60th part of a natural day, which they call a *gurry*, and each hour or *gurry* contains 24 minutes and each minute 24 seconds.

Q. What is a year ?

A. The solar or chronological year is a space of twelve months ; which is the time the sun takes in passing through the twelve signs of the zodiac.

Q. Do the years of all nations commence at the same time ?

A. No ; the Christian nations generally begin their year as we do ; excepting those of the Armenian church, who still begin at March. Nations not Christians, begin their year at various periods ; some with the vernal equinox ; some with the autumnal ; and in some parts of Asia, the year is computed by the harvest.

Q. What is a century ?

A. A century is a course of a hundred years ; and estimated frequently as three ages, in the succession of generation.

## CLASS IV....LESSON II.

## OF CHRONOLOGY.

Q. YOU mentioned the chronological year ....is there any other?

A. Yes, several....there are three kinds of solar years, and four kinds of lunar months.

1. The *tropical* year, or the interval at the end of which the sun returns to a given point of the ecliptic, consisting of  $365d\ 5h\ 48'\ 48''$ .

2. The *sidereal* year, or term at which the sun returns to a given star, of  $365d\ 6h\ 9'\ 10''$ .

3. The *anomalistical* year, or period when the sun returns to the same apsis;  $365d\ 6h\ 9'\ 19''$ .

The months likewise vary; there are lunar months of four kinds.

1. *Periodical*, or the interval marked by the return of the moon to the first point of Aries, in  $27d\ 7h\ 43'\ 5''$ .

2. *Sidereal*, its return to a fixed star,  $27d\ 7h\ 43'\ 12''$ .

3. *Synodical*, or the term of its return to the sun,  $29d\ 12h\ 44'\ 3''$ .

4. *Anomalistical*, or term when it returns to its apogee, of  $27d\ 13h\ 18'\ 33''$ . In comparing the lunar with the solar month, the synodical must be understood.

Q. Have not the poets made another division of history?

A. Yes....they distinguished first the *golden* age, which they attributed to Saturn and Rhea, meaning by it, the more perfect and happy state of men in the first ages of the world.

2d. The second; the *silver* age, ascribed to the reign of Jupiter, and which extended to the time

that tyrants appeared among the human race; who, to render themselves powerful, oppressed mankind by violence and injustice.

3d. The third was the *brazen* age, which was when rapacious men, possessed with the lust of dominion, endeavored to reduce their brethren to a state of slavery.

4th. The fourth age is that of *iron*, when all sorts of crimes began. They allege that the iron age still continues.

Q. Whence is the notion of four ages derived?

A. It appears to have been borrowed like the greater part of the Egyptian and Grecian institutions, from Asia. The four ages, or *jougs*, strictly correspond with the golden, silver, brazen, and iron ages, of the Hindu chronology.

Q. What is the zodiac?

A. A circle, shewing the earth's annual or yearly path through the heavens. On this circle are marked the twelve signs, which are numbers of stars reduced by the fancy of men, into the forms of animals, and may be described in order thus :

The *ram*, the *bull*, the *heav'nly twins*,  
And next the *crab* the *lion*, shines,  
The *virgin* and the *scales* :  
The *scorpion*, *archer*, and *sea-goat*,  
The man that holds the *water pot*,  
And *fish* with glittering tails.

Q. What is meant by the seasons of the year?

A. The changes and varieties which happen in nature by the yearly revolution of the earth round the sun.

Q. How many are there?

A. Four without the tropics.

How are they called?

Spring, Summer, Autumn, and Winter.

How long does each season continue?

Three months. Spring begins on the 21st of March, Summer on the 21st of June, Autumn on the 23d of September, and Winter on the 21st of December.

Are not the seasons the same within the tropics?

No....where there is neither frost nor snow, nor a general fall of the leaf, there is no winter.

When is the length of the day and night equal?

This happens twice in every year, once on the 21st of March, and again on the 21st of September. Both these are called the *equinoxes*; the first is called *the vernal equinox*, and the second *the autumnal equinox*.

How do we call the light that appears before the sun rises and the setting of the sun?

The light seen before the sun is called *Aurora*, and after the sun sets, the twilight; *mean-while* light and darkness.

What do you call the dog days?

Those intensely hot days between the 19th of July, and the 28th of August: the star called *the dog star*, during that time, was observed to rise and set with the sun, and from thence the name was given.

When is the longest day?

On the 21st of June, at the beginning of summer; after which they begin gradually to decrease.

When is the shortest day?

The 21st of December, at the beginning of winter; after which, they begin gradually to increase.

Q. Is this change the same in every part of the earth?

A. No....it is more or less, according as the country is situated farther from, or nearer to the æcliptic, or course of the sun. There are, for example, some countries where the length of the day and night is always exactly, or nearly the same; others, where the night, during the summer season, is only an hour; others where night continues always six months, and the day consequently as many. This variety in the length of the day and night is explained by the globe.

Q. What other name is given to the 21st June?

A. The *summer solstice*, because then the sun apparently stops short in his journey towards the north, and begins to return southward.

Q. And what other name is given to the 21st of December?

A. The *winter solstice*, because then the sun apparently stops short in his course towards the south, and begins to return northward.

Q. What are the names of the twelve months in their order?

A. January, February, March, April, May, June, July, August, September, October, November, December.

Q. How many days does each of these months contain?

A. Seven have thirty-one days; four have thirty days; and one has twenty-eight, or twenty-nine.

According to these verses:

Thirty days hath September,  
April, June, and November;  
February twenty-eight alone,  
All the rest have thirty-one.  
But in leap year time,  
February hath twenty-nine.

What is an Olympiad?

A space of four years. The ancient Greeks acted in this manner, because they celebrated games at the beginning of every fifth year, were contests in all the manly exercises, as wrestling, boxing, running, chariot races, in a plain near the town of Olympias; for reason they were called Olympiads. They said to have been instituted by Hercules, in the time of Jupiter, 774 years before Christ.

What is an epoch?

An epoch is a certain point of time, from which historians begin to reckon; as the creation of the world, the building of Rome, the birth of Christ, the destruction of Jerusalem, the declaration of independence, &c.

What is an era?

It marks the time from one memorable event to another. For example....from the creation of the world to the deluge, is an era.

What is an age?

The word age has more than one chronological signification: it is sometimes used to signify a century, or a period of one hundred years....thus we say the 18th century, or that meaning the time beginning with the first of January 1701, and ending with the 31st of December 1800, a century or age. It is sometimes used in a more confined sense; as the Christian age....meaning the period of time, or of Augustus. The dark ages....meaning the period between the fall of the Roman empire and the revival of letters; which some make consist of five, and others of seven centuries. The age of Charlemagne, in the beginning of the 9th century; the age of Chivalry, or the age when romance had usurped the place of reason.

The average length of human life is called **an age**, that is about 30 years; certain periods of human life are also designated by the word **age**, as infancy, youth, manhood, and old age. In a legal sense age is very important; orphans are of age to choose guardians at 14; all youth at 18 are liable to be called upon to defend their country, and all above 45 are exempted, the period between 18 and 45 therefore is the military age; at 21 persons are declared to be of age, and competent to act for themselves without guardians.

Q. What is a **lustrum**?

A. A period of five years; being the time at which the census or enumeration of the Roman people was taken; thence the common expression of having passed so many **lustres**; meaning so many periods of five years, as ten **lustres** means fifty years.

Q. What is a **cycle**?

A. A period of time in which the same revolutions are renewed; such as the revolutions of the sun and moon. The cycle of the sun, is a period of 28 years, which being completed, the days of the months return to the same days of the week, as at the beginning of the cycle. The cycle of the moon, is a period of 19 years, in which the new moon and full moon, return to the same days of the year as at the beginning of the 19 years.

Q. What is the use of these cycles?

A. By the solar cycle, the dominical letter or Sunday letter is determined: the year of the lunar cycle, is called the prime or golden number; and from both, the feast of Easter is determined in the calendar of several christian churches.

What is a Jubilee ?

A public festival.

What is an indiction ?

A revolution of fifteen years, used only by Romans for *indicating* the times of certain acts made by the people to the govern-

It was established by Constantine, in the 12.

ording to the epoch by which we reckon, the time of every memorable transac-

M. i. e. *Anno Mundi*, the year of the world.

D. i. e. *Anno Domini*, the year of our Lord.

U. C. i. e. *ab urbe condita*, from the building of the city of Rome, and so of the other

example, we say,

h's flood happened A. M. 1656,

kings were expelled, and consular government established at Rome, ab U. C. 244.

erlemagne was crowned emperor of the A. D. 800.

erica was discovered by Christopher Columbus, October 11, 1492.

th America was discovered by Americus Vesputius in 1497.

adelphia was founded in 1683.

ton was evacuated by the British, March 1776.

Declaration of American Independence, 1776.



## CLASS IV....LESSON III.

## HISTORY.

Q. WHAT is history ?

A. History is a narration of the transactions of nations and individuals. It is derived from the Greek *istoria*, meaning a search after curious things, a desire of knowledge, or a description of things as they had been seen.

Q. What are the divisions of history ?

A. With regard to time, it is usually divided into ancient and modern ; by others it has obtained another division into three classes, that is : 1. The *obscure* or uncertain age ; 2. The *heroic* or fabulous age ; 3. The *historical* age. This last age begins with the first Greek Olympiad, which was 776 years before the Christian era, and 23 years before the founding of Rome ; and ended with the 364th Olympiad, 440 years after the birth of Christ.

Q. Are these all the divisions ?

A. By no means ; with regard to subject or matter, it is divided into *sacred*, *natural*, *civil*, *personal*, and *singular* ; there is beside, artificial history, or an account of the progress of the arts ; and miscellaneous history, which treats of the occurrences of human life ; and there is still another, that is *sacred*, and *profane*, *ancient*, *middle*, and *modern*.

Q. What is sacred history ?

A. Sacred history is that which is recorded in the Old and New Testament. The Old Testament contains the history of the Jews, or Hebrews, or those who were called the people of God. The New Testament contains the histo-

of Jesus Christ, and his disciples, who are called, after his name, Christians ; a branch of this is called ecclesiastical or church history.

Q. What is profane history ?

A. All other history beside holy scripture is called profane, but particularly that of the Heathen gods, demi-gods, and heroes : which see under the article mythology.

Q. What is ancient history ?

A. Ancient history is the account of all nations, from the creation of the world to the birth of Christ.

Q. What is modern history ?

A. It is the continuation of history from the birth of Christ to the present time.

Q. What is civil history ?

A. It is the narration of the internal history of states, and is classed into general and particular ; or into political, juridical, and domestic ; in a more extended sense, civil history is understood by universal history.

Q. What is personal history ?

A. It is usually called biography, as it records facts relating to one person, or a number of persons ; the lives of eminent men by Plutarch, is an admirable example.

Q. What is particular history ?

A. It is the description of a single action or event, a siege, battle, a war.

Q. What is the earliest written history we have ?

A. That of the creation of the world, in the Old Testament, the fall of man, the universal deluge, or flood, the preservation of the human race in the family of Noah, and the re-peopling the several nations by his three sons and their posterity.

Q. Is there not another division of history ?

A. Yes, into four remarkable periods or eras called the four universal monarchies ; but the idea is fanciful rather than solid.

Q. Why were they called universal ?

A. Because each of them extended over the greatest part of the then known world.

Q. What was the first of these universal monarchies ?

A. The *Assyrian empire*, founded by Nimrod, the son of Cush, and grandson of Ham, in the year of the Mosaic chronology 1800 : was continued by his son Ninus, and after him by his wife Semiramis, and ended under Sardanapalus, in 3260, enduring 1450 years.

Q. What was the second monarchy ?

A. The *Persian*. It began with Cyrus, in the year of the world 3468, and ended with Darius's being conquered by Alexander called the Great, in 3670, before Christ 330, lasting a little more than 200 years.

Q. By whom was the third monarchy established ?

A. The *Grecian*, which was the third universal monarchy, was established by Alexander, of Macedonia, 330 years before Christ, and lasted no longer than his life ; for at his death, as there was no proper successor left, his generals divided the empire amongst them.

Q. Why was Alexander called the Great ?

A. Not on account of his virtues, but on account of the ravages which he spread over every nation that would not submit to him ; the success of his ambition commanded terror, astonishment, and admiration ; for mankind are too apt to venerate irresistible power. In twelve

Years he subdued all the nations from the Adriatic sea, to the river Ganges in India.

Q. What was the fourth monarchy?

A. The *Roman*, founded by Romulus, B. C. 753, which ended with the expulsion of the Tarquins for their tyranny B. C. 538; whenceforth Rome flourished until it became, under Augustus Cæsar, mistress of the whole earth, excepting China, and those countries that were either unknown, or inhabited by savage nations, or too inconsiderable to attract regard.

Q. Did not the Roman government undergo many changes?

A. Yes; the first state of Rome was oligarchical, and then regal, under twelve successive kings; the next was consular, under a series of consuls, annually appointed, for the space of four hundred and seventy years.

Q. What followed this consular period?

A. There were many cruel struggles of the people against the patricians who oppressed and robbed them: and at length a conspiracy was formed between Julius Cæsar, Pompey, and Crassus, to usurp the power into their own hands; but Cæsar aspiring to the sovereignty alone, after a long war with Pompey, whom he defeated, gained to himself the empire; but he was put to death for usurpation by a band of Roman citizens who devoted their lives to the freedom of their country.

Q. Was Rome liberated?

A. No, never after; for Octavius, a relative of Julius Cæsar, with Antony and Lepidus, formed another triumvirate, and having the soldiery at command, defeated, put to death, or banished all that was virtuous at Rome; and at length Octavius assumed imperial power with the name

of Augustus Cæsar, and the Roman liberties perished 27 years before Christ.

Q. Did the empire remain?

A. Until the year 476, of our era, when Augustulus, the last emperor, was defeated by Odoacer; and from that period the Roman empire became the prey of the Goths, Lombards, and Franks, until the establishment of the various petty governments, some of which yet exist, and others are undergoing changes; which belong to the history of modern Europe.

Q. What effects followed the inroads of the barbarians?

A. The temporary destruction of the fine arts and the suspension of literature, which occasioned the intervening period from thence to the tenth century to be called the dark age.

Q. What was the effect upon nations?

A. Petty governments were formed in Italy, and other parts of Europe, but the whole power was vested in some particular families, whose chiefs assumed the titles of counts, marquises, dukes, princes, kings, or emperors.

Q. Which was the most distinguished of these nations?

A. That of the Franks....from whom and the Gauls have sprung the modern French.

## CLASS IV...LESSON IV.

Q. WHAT families first assumed the crown of France?

A. After the declension of the Roman empire, the Franks broke in upon the Gauls, and conquered the country: their first king was *Pharamond*, A. D. 419: of this family were twenty-one kings; the second race began under *Pepin*, A. D. 751. This line was followed by the Capetian race, so called from Hugh Capet, A. D. 988. This family was succeeded by the house of *Valois*, in the person of Philip VI. A. D. 1328. Upon the extinction of this family the succession fell upon that of Bourbon, A. D. 1589; which terminated with Louis XVI. in 1793; when a revolution took place that is not yet closed; but which has converted France into an empire, under a new dynasty established in 1804.

Q. What races of kings have succeeded to the Spanish crown?

A. After the expulsion of the Romans, Spain had been governed by five families: the first from the Goths; the second, after the invasion of the Moors of Africa, from *Don Pelagio*; the third from *Don Sancho*, king of Navarre; the fourth from the house of Austria, by the marriage of *Joanna*, daughter and heiress of Ferdinand, surnamed the *Catholic*, to Philip, archduke of Austria, eldest son of the emperor Maximilian; and the fifth from the house of Anjou, grandson to Louis the XIV. whose descendants also reigned in Spain and the two Sicilies: until they were deposed by the emperor of the French in 1808.

Q. Of what family is the emperor of Austria?

A. Descended from Rodolph I. Count of Hapsburg and Landgrave of Alsace, who was the first of his family that obtained the empire of Germany. He was elected, A. D. 1273.

Q. Of what family is the emperor of Turkey?

A. Of the Ottoman family, so called: from the warlike Sultan *Othman* or *Osman*, who, A. D. 1300, carried his conquests to a prodigious extent.

Q. Who were the kings of Portugal?

A. Portugal became a kingdom about the middle of the twelfth century. Count Henry receiving some territories bordering upon it from Alonzo king of Leon, as a marriage dowry with his daughter, he expelled the Saracens, and his son Alonzo conquered Lisbon, and assumed the title of king of Portugal in 1136. In 1580 Philip II. of Spain seized upon this country; but in 1640 the duke of Braganza recovered it, and in his family it remained independent of Spain until the family was obliged to emigrate to Brazil by the French in 1806.

Q. How is Holland governed?

A. Formerly it was governed by a stadtholder or captain general, who was expelled in 1795; it was afterwards erected into a monarchy under a brother of the French emperor, but it was, in 1810, annexed to and incorporated with France and divided into departments conformable to the French system.

Q. What is the present government of Italy?

A. It was divided into little principalities, and dukedoms, and the government of the Pope; but it has been constituted a kingdom attached to the French empire, and governed by a vice-roy.

The pope no longer reigns as a temporal prince, and the son of the French emperor, upon his birth, 20th March, 1811, was styled king of Rome.

Q. What is the established government in England?

A. It is called an hereditary monarchy, and females are capable of succession. The title of the present chief of the government is King of the United Kingdoms of Great Britain and Ireland.

Q. How was England anciently governed?

A. England was first under the *Britons*; 2dly, made tributary to the *Romans*, under Julius Cæsar; 3dly, under the *Saxons*; 4thly, under the *Danes*; and 5thly, under the *Normans*; whose conquest of that island, by William of Normandy, is the epoch from whence the historians of that country principally compute.

Q. Name the succession of the English monarchs from the conquest, with the several families.

A. 1st. Four Norman kings....1. William of Normandy; 2. William Rufus, his second son; 3. Henry I. a younger brother; 4. Stephen, a younger son of Henry's first sister.

2d. Fourteen kings of the family of Plantagenet, who governed 331 years....1, Henry II.; 2, Richard I.; 3, John; 4, Henry III.; 5, Edward I.; 6, Edward II.; 7, Edward III.; 8, Richard II.; 9, Henry IV.; 10, Henry V.; 11, Henry VI.; 12, Edward IV.; 13, Edward V.; 14, Richard III.

3d. Five of the house of Tudor, who sat upon the throne 118 years....1, Henry VII.; 2, Henry VIII.; 3, Edward VI.; 4, Mary; 5, Elizabeth.



4th. Six of the house of Stuart : 1, James I. ; 2, Charles I. ; 3, Charles II. ; 4, James II. ; 5, Mary II. queen of William III. ; 6, Anne.

5th. One Englishman under the name of Protector, *Oliver Cromwell*.

6th. One king a Dutchman.... William III.

7th. Three from Brunswick, in Germany, which family succeeded upon the death of Anne : 1, George I. ; 2, George II. ; 3, George III.

Q. Was England always governed as a monarchy ?

A. The name of monarchy has been always used, but the government has really been a government of *several* and not of *one*, as the word monarchy implies.

Q. Has there not been a republic in England ?

A. After Charles I. had been beheaded for his tyranny, England was called a commonwealth ; but the people were too ignorant, and their leaders too wicked to maintain a free commonwealth : Oliver Cromwell, who was called *protector*, was the most arbitrary of all their monarchs ; and contributed more to their political power and grandeur, than all the kings who have succeeded him.

Q. How are the Swiss now governed ?

A. The old form of the Swiss confederation is abolished, and a new confederation formed, and the number of territories or states augmented.

Q. Are there no other governments in Europe ?

A. I only noticed those comprehended within the ancient Roman Empire. There are others ; as Sweden, Denmark, Russia, and Prussia ; these shall be noticed in the geographical lessons.

AN EPITOME  
OF THE  
ARTS AND SCIENCES.

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## CLASS V....LESSON I

## OF GEOGRAPHY.

Q. WHAT is geography ?

A. Geography is the science which describes the extent and subdivisions of the surface of the earth, the parts of which are land and water.

Q. Explain in what the parts consist ?

A. The land consists of continents, islands, peninsulas, and isthmuses ; and the water of oceans, seas, gulfs, straits, rivers, and lakes.

There are properly only two continents ; for Europe, Asia, and Africa, are separated but by geographical lines ; and the other consists of North and South America, which are connected by the narrow isthmus of Darien.

An island is a portion of land surrounded by water, such as Cuba, Bermuda, Long Island, Great Britain, Ireland, Jamaica, and Borneo.

A peninsula is a tract of land almost surrounded with water, as East Florida, Malacca in Asia, and the Morea in Greece.

An isthmus is a neck of land which joins a peninsula to a continent, or two continents together, as the isthmus of Suez in Egypt, which joins Africa to Asia, and the isthmus of Panama or Darien, which joins North to South America.

There are four oceans ; the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, and the Northern Ocean.

A sea is a smaller collection of water, as the Mediterranean Sea and the Black Sea.

A gulf or bay is an arm of the sea, which runs a considerable way into land, as the gulf of Mexico, the gulf of Guinea, and the bay of Biscay.

A strait is a narrow part of the sea, forming a passage from one sea to another; as the strait of Gibraltar, the strait of Magellan in South America, and the straits of Babelmandel in the Red Sea.

A cape or promontory is a point of land jutting out of the sea; as Cape Henlopen, Cape Comorin, the Cape of Good Hope, and Cape Horn.

Q. What of the earth in general?

A. The earth is a large globe, the diameter of which is nearly eight thousand miles ( $7935\frac{1}{2}$ ) and its surface contains nearly two hundred millions of square miles, (199,512,595) of which near three fifths are covered with water.

The land occupied by upwards of a thousand millions of human beings, is divided into four great nominal parts, sometimes called quarters; Europe, Asia, Africa, and America.

Q. What proportion does the land bear to the water in the different parts of the globe?

A. The following is the estimated amount of square miles to each section of the earth:

America,	-	-	-	14,110,874
Asia,	-	-	-	10,768,823
Africa,	-	-	-	9,654,807
Europe,	-	-	-	4,456,065
				<hr/>
				38,990,569
Seas, lakes, and lands unknown,				160,522,026
				<hr/>
Total surface of the globe,				199,512,595

The inhabitants amount to about 1000 millions persons.

## OF EUROPE.

Q. As Europe is the most celebrated, give some account of that quarter of the world?

A. Europe, though the smallest of the grand divisions or quarters of the world, is inhabited by the most active and intelligent race of people. It comprehends numerous nations, which are thus named at present....Lapland, Norway, Sweden, Russia, Denmark, Saxony Prussia, Bavaria, the confederation of the Rhine, Austria, Turkey, France, Switzerland, Italy, Portugal, Spain, and Great Britain and Ireland.

Q. What is its extent?

A. From N. E. to S. W. about 3000 miles; its breadth, East and West, about 2500 miles; and is situated between 35 and 71 degrees, north latitude.

Q. What in the natural history of those countries is remarkable?

A. The three grand inland seas; which are the Mediterranean, the Baltic, and the White sea.

Its principal islands are Great Britain, Ireland, Iceland, Zealand, Corsica, Sardinia, Sicily, and Candia.

Its principal rivers are the Wolga, the Danube, the Neiper, the Rhine, the Rhone and the Elbe.

Its most elevated mountains are: the Alps, which separate Italy from Germany, Switzerland, and France. The Pyrennees, between France and Spain. The Defrafeld mountains, between Norway and Sweden. The Carpathian mountains, which bound Hungary to the north and east.

The principal capes in Europe are, the North Cape, the Naze, the Land's End, Cape la Hogue, Cape Clear, the Lizard, Cape Finis-terre, St. Vincent, and Metapan.

Q. What is Lapland?

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*A.* Lapland is divided into Danish or North Lapland ; and Russian or East Lapland ; and is principally covered with immense forests, chiefly of fir, and with pastures abounding with reindeer.

In some parts of Lapland (near the north pole) the sun is absent for about seven weeks ; but from ten in the forenoon, till between one and two in the afternoon, the twilight is sufficient for persons to read without a candle ; the stars are visible at noon, and the moon shines without intermission. In the summer, on the contrary, the sun never sets for seven weeks together.

Q. Inform me concerning Norway.

*A.* Norway is dependent upon Denmark ; and divided into four general governments, viz. Aggerhuys, Bergen, Drontheim, and Wardhuys ; the chief town of Norway is Bergen. Norway is the most mountainous country in the world ; the inhabitants have neither cornfields nor gardens, but subsist chiefly by hunting and fishing.

The chief wealth of Norway lies in its fir timber, with which foreign nations are supplied. It possesses quarries of excellent marble and mines of various metals.

Q. Is there not a celebrated whirlpool on the coast of Norway ?

*A.* Yes ; the vortex called the Maelstroom, which is heard at a great distance, and forms a whirlpool of a vast depth and extent, and so violent, that if a ship come near it, it is drawn in and shattered to pieces.

Q. Describe Denmark to me ?

*A.* Denmark proper is a comparatively small country, containing only the peninsula of Jutland, and the islands of Zealand, Funen, &c. at the entrance of the Baltic ; Copenhagen, the capital city, is in the island of Zealand ; and at Elsinore all foreign ships that trade to the Baltic pay toll.

Q. What is remarkable beside in Denmark?

A. Iceland, subject to Denmark, abounds in sulphur, subterranean fires, and volcanoes; mount Hecla is a volcano one mile high, and its sides are always covered with snow.

Greenland and the Ferro islands are subject to Denmark.

A volcanic island recently rose to the south of Iceland, but it quickly disappeared again.

Extent of Denmark 170,000 square miles. Population 2,150,000; 12 to a square mile.

Q. Give some account of Sweden?

A. Sweden was divided into Sweden proper, Gothland, Finland, Swedish Lapland, and the Swedish islands; the capital is Stockholm, which is built on seven rocky islands, and united by bridges; the other principal towns are Upsal, famous for its university: Gothenburg, in Gothland; Tornea, in Lapland; and Abo, in Finland. But in the late war with Russia it has lost three fourths of Finland.

The chief wealth of Sweden arises from its mines of silver, copper, lead, and iron; which are so very spacious as to form a kind of subterraneous world.

The country of Sweden is mountainous, and contains lakes of great extent, and rivers numerous and navigable, issuing principally from the Norwegian mountains.

Q. What is there remarkable in Sweden?

A. In the Baltic Sea there are no tides, though there is a current constantly running from it into the Northern Ocean. The islands about the Baltic amount to several thousand, most of them inhabited and abounding with natural curiosities, and singular and sublime scenery.

Extent 209,000 square miles; population 3,000,000; persons to a square mile 14.

Q. What of the Russian empire?

*A.* It is comparatively modern ; it owes its greatness and civilization to Peter properly called the great, not on account of his murders of mankind, for he engaged in no offensive wars, but for being the benefactor of humanity and introducing civilization among savages.

Q. How long has this empire existed ?

*A.* It was little better known than Tartary at the close of the seventeenth century ; Peter died in the beginning of the 18th century, 1725. His successor Katharine I. was the first empress, she died two years after Peter the Great.

Q. What is the empire as to extent ?

*A.* The largest in the world ; comprehending the northern parts of Europe and Asia ; but a small part of its inhabitants only are civilized. The principal cities are Moscow the ancient capital, and Petersburg the modern capital ; beside Archangel, on the White Sea ; Cherson on the Euxine ; Astrachan on the Caspian, and Tobolsk capital of Siberia.

It is mostly a level country : from Petersburg to Pekin in China, is not obstructed by a single hill : the principal lakes are Ladoga and Onega ; the rivers, the Wolga 3000 miles in its course falls into the Caspian, by more than 70 mouths ; the Don, the Neiper, the Neister. The climate is severe in some parts. The inland navigation is extensive ; the trade in timber, flax, hemp, copper, and fish, is very great.

The extent of Russia, before the partitions of Poland in 1772, 1793, and 1796, was 4,660,000 square miles. Population 25,000,000 ; 5 to a square mile.

By the partition of Poland a territory had been added containing 4,000,000 of people ; but the French revolution has produced some changes, which as they may change again, it is not necessary now to notice.

## CLASS V...LESSON II.

## OF EUROPE.

Q. WHAT is the history of Prussia ?

A. This is a kingdom created in the beginning of the 18th century ; it was formerly subject to the Teutonic knights, who held it as a fief of Poland ; from its dependance on Poland it was released in 1657, and in 1701, constituted into a kingdom. In the year 1719, soon after it was erected into a kingdom, it obtained, by the religious persecutions in France, an accession of thirty thousand emigrants, who built 11 towns, 400 villages, 50 churches, and founded 1000 schools. The original Prussia, called Ducal Prussia, was small, but by the conquest of Silesia from Austria, in the seven years war, and the partition of Poland in 1772, 1793, and in 1796, it was made an extensive country.

It was divided into Royal Prussia, Ducal Prussia, and the Duchy of Brandenburg, part of Magdeburg, and Halberstadt. Before the first partition of Poland, Prussia contained about 5,000,000 of people ; by the partition of 1772, it obtained an addition of about 800,000 ; and by the second in 1793, about 1,600,000 ; in 1796, about 2,000,000.

The extent of Prussia before the acquisitions in Poland, was about 56,000 square miles ; from Poland about 40,000 were obtained, making in the whole, about 96,000 ; the whole population about 9,300,000 ; or about 96 to a square mile.

But by the war against France in 1806, Prussia lost Warsaw, and all the partitioned part of Poland, beside other territories, reducing its population to about 5,000,000.



The capital is Berlin ; but there are also Königsburg, Thorn, Elbing, Glatz in Silesia.

The chief rivers are the Vistula, Neimen, Pregel, and Namel.

Q. Is not the German empire very extensive?

A. Before the war of the French revolution in 1792, its extent was 197,000 square miles, and contained 25,000,000 of inhabitants, beside the hereditary dominions of the house of Austria, part of which, the Netherlands, have been conquered and incorporated with France.—Germany is divided into a number of states, among which are comprehended several independent states, such as Prussia, Bavaria, Saxony, Wirtemberg, Westphalia, &c. Its constitution or frame of government known by the name of the Germanic body, a kind of federal government, was overturned after the battle of Austerlitz in 1805, and has been superceded by what is called the Rhenish confederation, of which we shall take some notice.

Germany contained nine great circles, viz. Austria, Bavaria, Suabia, Franconia, Upper Saxony, Lower Saxony, Westphalia, Lower Rhine, and Upper Rhine ; but these circles no longer exist, and the emperor is no longer emperor of Germany but of Austria.

The chief city of the empire is Vienna, the residence of the emperor ; the other large cities are very numerous, as Dresden in Saxony ; Munich in Bavaria ; Mannheim, Wirtemberg, Constance, Hanover, Frankfort, Leipsic, and others.

The principal rivers are the Danube, the Rhine, which divides Germany from France, the Maine, the Necker, the Inn, the Drave, the Elbe. Population 108 to a square mile.

Q. What are the Austrian dominions?

A. They are the hereditary dominions of the reigning family, comprehending Austria proper, Bohemia, Hungary, Styria, and part of Poland. Austria gained four millions of people by the partition of Poland, and about 50,000 square miles of territory; but part of this has been since ceded to Russia.

The principal towns in the Austrian dominions beside Vienna, are Prague, Presburg, Buda, and Cracow.

The principal mountains are the Carpathian, the Alps, (of which the Bremmer is one mile high,) and the mountains of Styria.

Q. Was not the emperor of Germany formerly king of Spain?

A. The emperor Charles V. was monarch of Spain also, but it was separated from the German crown under his son Philip II.

Q. You mentioned the Rhenish confederacy, what is that?

A. After the Battle of Austerlitz, a treaty was formed at Presburg, the 26th December 1805, by which the emperor of Germany relinquished that title, and assumed that of emperor of Austria, and acknowledged the French emperor as king of Italy. Fourteen of the princes assembled at the Diet of the empire, on the 1st of August 1806, declared their absolute, and perpetual separation from the German body, and their determination to form a new confederation on the banks of the Rhine.

Q. And how did they proceed?

A. They assembled at Frankfort on the Maine, and formed a constitution; by which they provided for mutual defence, regulated

their contingents of force, and claimed the emperor of the French as their protector.

Q. What princes were they?

A. Those who met, formed themselves into two colleges; one called the college of kings, and were composed of 1, the king of Bavaria; 2, the king of Wirtemberg; 3, grand duke of Baden; 4, grand duke of Berg; 5, grand duke of Hesse Darmstadt; 6, the prince primate, president of this college. Of the college of princes, the first was the duke of Nassau, who was president of the college; 2, prince of Hohenzollern; 3, prince of Salm; 4, prince of Yssemberg; 5, prince of Lichtenstein; 6, prince de Leyen.

Q. These make but twelve, beside the prince primate?

A. There are several of these princes who have two houses, with princes at the head of each; such as Nassau, of which there are two, Hesse two, and Salm two.

Q. Do these comprize the whole?

A. No....soon after their formation, there were added, the grand duke of Wurtzberg, the king of Saxony, and the five branches of that house, the king of Westphalia, three branches of Anhalt, two branches of Schwartzenberg, the prince of Waldeck, prince of Reuss, prince de Lippe. The three Hanseatic cities also joined; but they were in December 1810, incorporated with France; Prussia joined in 1811. The population of these confederates amounted to near 20,000,000 of persons.

## CLASS V...LESSON III.

## GEOGRAPHY.

Q. What is the extent and population of Spain?

A. Its extent is 150,263 square miles ; population about 10,000,000, about 70 to a square mile. It is divided into fourteen districts or provinces ; six north, Galicia, Asturia, Biscay, Navarre, Arragon, and Catalonia ; five middle, Leon, Estramadura, Castile Old and New, and Valencia ; three south, Andalusia, Granada, and Murcia.

Its capital is Madrid ; chief towns Cadiz, Seville, Barcelona, Valencia, and Corunna.—The principal rivers, the Ebro, Tagus, and Douro. On a promontory in the south of Spain stands Gibraltar. The chief islands of Spain are Majorca, Minorca, and Ivica, all in the Mediterranean sea.

Q. Has not Spain vast foreign possessions?

A. She had in South America, and some islands in the great Indian Archipelago, which are described under the general account of Asia and South America ; but in 1810 the South Americans asserted their independence.

Q. Have not the Portuguese acquired great celebrity in history?

A. The Portuguese were among the earliest and most celebrated navigators of modern Europe ; they were the first who entered upon the spirit of discovery, and by doubling the Cape of Good Hope, led to the discovery of America.

Q. What was the cause of her decline?

*A.* The same cause that has enervated and destroyed the gallantry and enterprize of the Spaniards ; the acquisition of excessive riches. The Portuguese at one period, had the exclusive commerce of all Asia, in which they were superceded by the Dutch, who are now superceded by the English.

Q. What is the extent of Portugal ?

*A.* It lies on the coast of the Atlantic, to the south of Spain, is only 27,000 square miles in extent, and its population not quite 2,000,000 ; and it never has amounted to 3,000,000. Its population per square mile is about 62.

Q. Relate the circumstances of Turkey in Europe ?

*A.* It includes ancient Greece, and other countries, formerly esteemed the finest in the world, but now the most wretched. Its northern provinces were Moldavia, Bessarabia, Wallachia, Servia, Bosnia : the middle, Bulgaria, Romania, Macedonia, Albania, and Epirus : the south, called Greece, contains Thessaly, Achaia, and the Morea.

The metropolis is Constantinople, on the sea of Mormora, at the entrance of the Euxine..... Adrianople is the second city ; and the principal rivers are the Danube, Save, and Neister. The chief mountains are the classic Pindus, and Olympus, which separate Thessaly from Epirus ; Parnassus, Athos, and Hermus. The islands are numerous, as Rhodes, Candia, Cephalonia, &c.

## CLASS V...LESSON IV.

## OF EUROPE.

Q. WHAT is the situation of France ?

A. Before the revolution which commenced in 1799, France was divided into 18 provinces, besides 4 provinces in the Netherlands, containing about 131,095 square miles, and 25,000,000 of inhabitants. Upon the conquest of Piedmont, it was divided into 108 departments. By an imperial decree of 1810, the territory of Holland was united to the French empire, together with the coast of the North sea, from Holland to the Elbe, which was divided on the 1st of January 1811, into nine departments, according to the order annexed ; which exhibits the *old* and the *new* names of the countries.

DEPARTMENTS.	ANCIENT PROVINCES.	CHIEF TOWNS.
1. Lower Alps	4 Provence	Toulon Avignon
2. Mouths of the Rhone		
3. Var		
4. Vaucluse		
5. Upper Alps	3 Dauphine	Grenoble
6. Drome		
7. Isere	3 Franche-Compte	Besancon
8. Doubs		
9. Jura	2 Alsace	Strasburg
10. Upper Soane		
11. Lower Rhine	4 Lorraine	Metz
12. Upper Rhine		
13. Meurthe		
14. Meuse		
15. Moselle	4 Champagne	Troyes
16. Vosges		
17. Ardennes		
18. Aube		
19. Marne		
20. Upper Marne		

DEPARTMENTS.	ANCIENT PRO- VINCES.	CHIEF TOWNS.
21. North	2 Flanders	Douay
22. Calais		
23. Aisne		
24. Oise	6 Isle of France	Paris Amiens Versailles
25. Seine		
26. Seine and Oise		
27. Somme		
28. Seine and Marne		
29. Calvados	5 Normandy and Perche	Caen Rouen
30. Eure		
31. Manche		
32. Orne		
33. Lower Seine		
34. North Coast	5 Bretagne	Nantes Vannes
35. Finisterre		
36. Ille and Vilaine		
37. Lower Loire		
38. Morbihan		
39. Indre and Loire	4 Upper and Lower Maine	Tours
40. Mayenne		
41. Mayenne and Loire		
42. Sarthe	3 Poitou	Niort Poitiers
43. Deux Sevres		
44. Vendee		
45. Vienne	3 Orleanois	Orleans Blois
46. Eure and Loire		
47. Loire and Cher		
48. Loiret	2 Berry	Bourges
49. Indre		
50. Cher	1 Nivernois	Nevers
51. Nièvre		
52. Ain	Burgogne, 4 Valromey, Aunerois, &c.	Dijon Macon
53. Cote d'Or		
54. Yonne		
55. Soane and Loire	2 Lyonnais, Fores, &c.	Lyons
56. Loire		
57. Rhone	1 Bourbonnois	Moulins
58. Allier		
59. Correse	3 Limousin, Marche, &c.	Limoges
60. Creuse		
61. Upper Vienne	1 Angoumois	Angoulême
62. Charente		

DEPARTMENTS.	ANCIENT PROVINCES.	CHIEF TOWNS.
63. Lower Charente	1 Annis	Saintes
64. Dordogne	1 Perigord	Perigueux
65. Gironde	} Bourdelois, 4 Armagnac, &c.	Bordeaux
66. Landes		
67. Lot and Garonne		
68. Gers		
69. Lot	1 Quercy	Cahors
70. Aveyron	1 Rouergne	Rhodez
71. Lower Pyrennees	1 Bearn	Pan
72. Upper Pyrennees	1 Bigorre	Tarbe
73. Arriege	1 Causerans	Tarascon
74. Eastern Pyrennees	1 Rousillon	Perpignan
75. Ardeche	} Languedoc, 8 Cononingen, &c.	Toulouse Montpelier Nismes
76. Aude		
77. Gard		
78. Upper Garonne		
79. Herault	} Velay, Au- vergne, &c.	Clermont
80. Lozere		
81. Tarn		
82. Tarne and Garonne.		
83. Cantal	} 1 Corsica	Ajaccio
84. Upper Loire		
85. Puy de Dome		
86. Corsica		
87. Mont Blanc	} 3 Savoy, Nice, and Geneva	Bastia Chamberry Geneva
88. Maritime Alps		
89. Lemane		
90. Dyle		
91. Escaut	} Hainault 9 Flanders Brabant Leige	Brussels Leige Namur
92. Forets		
93. Gemmape		
94. Lys		
95. Lower Meuse	} Aix-la-Cha- pelle	Treves Coblentz Mayence
96. Deux Nethes		
97. Ourthe		
98. Sambre and Meuse		
99. Roer	} 4 Alsace, &c.	Sien
100. Sarre		
101. Rhine and Moselle		
102. Mont Tonnere		
103. Simplan	Valais	



DEPARTMENTS.	ANCIENT PROVINCES.	CHIEF TOWNS.
104. Ain	Piedmont	Mantua
105. Appennines	Genoa	Echiavari
106. Doir	Piedmont	Turin
107. Genoa	Genoa	Bobbio
108. Marengo	Piedmont	Alexandria
109. Montenotte	Savona	Acqui
110. Po	Piedmont	Turin
111. Sesia	Piedmont	Vercell
112. Stura	Piedmont	Conic
113. Taro	Parmesan	Parma
114. Arno	Tuscany	Florence
115. Mediterranean	Tuscany	Livorne
116. Ombrone	Tuscany	Sienna
117. Campania	Rome	Rome
118. Thrasymene	Do.	
119. Zuyderzee	Seven united provinces	Amsterdam
120. Mouths of the Meuse		
121. Upper Yssel		
122. Mouths of the Yssel		Embden
123. Frise		
124. West Ems		
125. East Ems		Hamburg
126. Upper Ems.		
127. Mouths of the Weser		
128. Mouths of the Elbe		

The colonial departments were 13, but France has not now a single possession out of Europe....

The following was their arrangement :

St. Domingo	-	-	-	5	Departments
Guadaloupe	-	-	-	1	All taken by the British.
Martinique	-	-	-	1	
Cayenne	-	-	-	1	
St. Lucie and Tobago	-	-	-	1	
Grenada	-	-	-	1	
Isle of France	-	-	-	1	
Bourbon	-	-	-	1	
Continental India, Pondicherry, Mahe, and Chandernagore,				1	

Q. Beside the city of Paris, which is the capital, which are the most considerable cities in France?

**A.** Lyons, Marseilles, Bordeaux, Lisle, Rome, Milan, Amsterdam, Hamburg, Brussels, Florence.

The principal rivers in France are the Rhone, Garonne, Seine, Sambre, Meuse, Moselle, and the Rhine, which is on the frontier next to Germany, Switzerland, and Batavia.

**Q.** What beside is interesting in France ?

**A.** The public works, such as canals and harbors, are worthy of admiration ; the canal of Languedoc is 180 miles long, and admits a complete navigation from the Mediterranean to the Atlantic. Several great canals have been constructed lately.

**Q.** What is the state of Switzerland ?

**A.** It has assumed its ancient classic name of Helvetia, and preserves a confederated form of government, and consists of the 13 old states of Zurich, Berne, Underwalden, Zug, Basil, Glaris, Soleure, Uri, Schwitz, Appenzel, Lucern, Friburg, and Schafhausen ; six other new cantons are formed out of the territories which were formerly in alliance or dependent on Helvetia without any rights of interference in the government.

**Q.** What districts were dependent ?

**A.** Baden, Bremgarten, Mellingen, Rheinthal, Thurgau, Lugano, Locarno, Mendris, and Maggia.

**Q.** Which were the Helvetian allies ?

**A.** There were the Grisons, Valais, St. Gal, Sargans, Tockenbourg, Neufchatel, Mulhausen, Chiavenna, Geneva, Bormio, and the Valteline.

**Q.** Were there not some others called independent Cantons ?

**A.** Yes....but they are now either united with the Swiss Cantons, or with France or Italy, or under new princes, such as Neufchatel, Bienne, Gerisau, Engleberg, Rapperschweil, Haller.

denstein, Baden, Morat, Granson, Echalen, Orbe, Schwartzenberg, Utznach, and Gaster.

Q. You mentioned Geneva, is that an independent state?

A. No; it has been incorporated with France, and some of the other districts, as part of the Valais had been added to the Italian republic, under the treaty of Campo Formio, concluded in 1797: but a department has been formed out of the Valais, called the Simplon, by a decree of December 1810.

Q. What are the principal cities and towns of Helvetia?

A. Every canton has its peculiar capital, but Berne is the largest, Zurich and Basil rank next.

Helvetia is a mountainous country, it is divided by the Alps from Italy; St. Gothard in Uri; and Mont Blanc on the borders of the French department of that name, are the highest in Europe. The principal lakes are Constance, Lemman near Geneva, Lucern, Zurich, and others. The Rhine, the Rhone, and the Aar, have their sources in this country. Helvetia contains about 18,000 square miles, population 2,500,000.

Q. Was not the Batavian republic a prodigy of human industry?

A. Its banks (called dykes) for keeping out the ocean and securing the land; its canals and industry, are not to be conceived but by examination. Amsterdam is one of the largest cities in Europe, is built upon piles drove into the earth, in a morass: the canals through the country are equally useful and curious.

The extent of the Batavian territory was 8,500 square miles, being about the same size as New Hampshire, something larger than Jersey, about one fifth of the size of Pennsylvania. The population 3,500,000, about 412 to a square mile.

## CLASS V...LESSON V.

## OF EUROPE.

Q. WHAT is the state of Great Britain?

A. Our former connexion with that country, and speaking the same language, render our acquaintance with its state more familiar than with others. Great Britain consists of the countries called England, Scotland, and Wales, and its government from the beginning of this century is called the United Kingdom of Great Britain and Ireland. Wales has for a long time ceased to be considered as separate from England, and the name of Scotland is nearly lost in that of Great Britain. England contains 40 counties, Wales 12, Scotland 33, and Ireland 32.

Q. Name them separately.

A. England, taken from north to south, contains....

Northumberland	Warwick	Hertford
Durham	Worcester	Middlesex
Cumberland	Hereford	Kent
Westmoreland	Monmouth	Surry
York	Gloucester	Sussex
Lancaster	Oxford	Berks
Chester	Buckingham	Hants
Salop	Northampton	Wilts
Nottingham	Bedford	Dorset
Derby	Huntingdon	Somerset
Lincoln	Cambridge	Devon and
Rutland	Norfolk	Cornwall
Leicester	Suffolk	
Stafford	Essex	

The principal city of the whole nation is London ; Bristol, Liverpool, Hull, Newcastle, Oxford, and Cambridge, other principal cities ; the two last are its most celebrated universities.

Its rivers are the Severn, Thames, and Mersey ; none of which are equal to our river Delaware in extent ; and all of them inferior to rivers of the third degree in the United States : the principal lakes are those of Winandermere, but compared with our American lakes they are mere bathing tubs.

Wales, a mountainous country contains the following counties....

Flint	Caernarvon	Glamorgan
Denbigh	Merioneth	Pembrokeshire
Montgomery	Radnor	Cardigan
Anglesey	Brecknock	Caermarthen 12

Scotland, also a mountainous country, has the following countries....

Edinburg	Dumbarton	Nairne and
Haddington	Bute and	Cromartie
Merse	Caithness	Fife
Roxburgh	Renfrew	Forfar
Selkirk	Perth	Banff
Peebles	Stirling	Sutherland
Lanark	Linlithgow	Clackmannon
Dumfries	Argyle	Kinross
Wigtoun	Kincardin	Ross
Kirkcudbright	Aberdeen	Elgin
Ayre	Inverness	Orkney 33

The principal city is Edinburg, and Glasgow and Aberdeen are two universities. The principal rivers the Firth, Tay, and Tweed, but they are not much larger than many of our American creeks ; their lakes, like those of England, are small, as Loch Lomond and Loch Ness.

Ireland is a separate island west of England and Scotland ; it is divided into four provinces, Leinster, Ulster, Connaught, and Munster ; the counties in each are

1. Dublin	Carlow	Roscommon
Louth	2. Down	Mayo
Wicklow	Armagh	Sligo
Wexford	Monaghan	Galway
Longford	Cavan	Clare
East Meath	Antrim	4. Cork
West Meath	Derry	Kerry
King's	Tyrone	Limerick
Queen's	Fermanagh	Tipperary
Kilkenny	3. Donnegal	Waterford 32
Kildare	Leitrim	

The principal rivers are not larger than in the neighboring island, excepting the Shannon, which is the largest in the two islands, the other rivers are the Liffey, Lee, Blackwater, Suir, Nore, and Barrow. Ireland has several small lakes also.

Dublin is the capital of Ireland, the other chief cities are Cork, Waterford, Limerick, Belfast, Derry, Galway.

Q. Are there not some islands under that government ?

A. Yes ; the isle of Wight forms part of Hampshire ; Jersey and Guernsey are on the French coast of the channel ; the isle of Man in the Irish sea ; the Scilly islands are off the promontory of Cornwall ; the Shetlands, Orkneys, and Hebrides, are off the coast of Scotland.

Q. What is that government called the kingdom of Italy ?

*A.* This country is at present united with the French empire. This country formerly composed the duchy of Milan, or the ancient Cis-Alpine Gaul.

*Q.* How is Italy, so celebrated, divided?

*A.* Italy has been indeed celebrated as the garden of Europe, and the seat of arts, and once mistress of the world.

The Roman state or territory now forms a part of the French empire: the kingdom of the two Sicilies, or Naples, is a kingdom also connected with France.

The old dynasty of the Bourbons, however, retain their court at Palermo, in Sicily.

Rome is the principal city of Italy; Tuscany, but which assumed its ancient name of Etruria, is also a part of the French empire; Milan is the capital of ancient Lombardy and of the present Italian kingdom.

The Appenine mountains run through the whole extent of Italy; Vesuvius has been celebrated as a volcanic mountain; as has Etna in the island of Sicily, which is separated from the S. W. part of Naples by the streights of Messina—chief towns in Sicily, Palermo and Syracuse.

*Q.* Are there not some other islands?

*A.* Yes; Sardinia to which the dominion of its king, (formerly duke of Savoy) is now limited. The principal town Cagliari: Corsica, which forms a department of France, stands between the continent of Italy and Sardinia. There is the island of Malta also about 60 miles south of Sicily, at present garrisoned by the British.

*Q.* Have there not been several additions to the kingdom of Italy by the last war of 1806?

*A.* There have : for besides Istria, a considerable part of Styria and Carinthia, all Carniola, a great part of Tyrol, and some part of Dalmatia and Craotia, have been added to the kingdom of Italy ; so that the river Save forms the boundary which separates the Italian kingdom from the Austrian territory.

The principal rivers of Italy are the Po, Arno, Tiber, Var, Adda, Adige, Trebia, Piave, Tagliamento, Liconso.

*Q.* You have not mentioned Venice or Genoa ?

*A.* Venice, as a power, was by the French overthrown, and its territory parcelled out between the Austrian emperor as was before noticed, but in the subsequent wars between Austria and France, it was taken from Austria, together with Istria and Dalmatia, and annexed to the kingdom of Italy.

Genoa, under the ancient classic name of Liguria, also forms part of the French empire.



# STATISTICAL TABLE OF EUROPE. 1844.

<i>Nations.</i>	<i>Capitals.</i>	<i>Population.</i>	<i>Extent. Square Miles.</i>	<i>Revenue in Dollars.</i>	<i>Government.</i>
Denmark.	Copenhagen.	2,150,000	160,000	7,500,000	Regal despotism.
Sweden.	Stockholm.	2,200,000	269,000	2,000,000	Oligarchical royalty.
Russia.	Petersburg.	36,000,000	820,000	50,000,000	Imperial oligarchy.
Prussia.	Berlin.	5,500,000	96,000	20,000,000	Regal despotism.
Saxony.	Dresden.	5,000,000	—	—	Regal despotism.
Austrian states.	Vienna.	18,000,000	203,000	14,000,000	Imperial despotism.
Bavaria.	Munich.	4,500,000	—	—	Regal despotism.
Helvetia.	Berne.	3,000,000	18,000	2,000,000	Federal Republic.
Westphalia.	Cassel.	1,600,000	—	—	Regal despotism.
Wurtemberg.	Stuttgart.	1,300,000	—	—	Do.
Great Britain.	London.	15,000,000	105,000	100,000,000	Oligarchical royalty.
France.	Paris.	42,000,000	257,000	135,000,000	Imperial despotism.
Kingdom of Italy.	Milan.	400,000	—	14,000,000	Regal fief of France.
Sardinia.	Cagliari.	500,000	—	—	Regal despotism.
Sicily.	Palermo.	2,000,000	27,850	5,000,000	Do.
Portugal.	Lisbon.	10,000,000	150,000	10,000,000	Conquered by France.
Spain.	Madrid.	8,900,000	152,000	15,000,000	Conquered by France.
Turkey (Europe)	Constantinople.	—	—	—	Imperial despotism.

1791 and 1811.

<i>Nations.</i>	<i>Capitals.</i>	<i>Population.</i>	<i>Extent. Square miles.</i>	<i>Revenue in dollars.</i>	<i>Government.</i>
Poland.	Warsaw.	8,500,000	120,000	25,000	Dukedom annexed to Saxony.
Batavia.	Amsterdam.	3,500,000	8,500	20,000,000	French departments.
Liguria.	Genoa.	500,000	2,400	2,000,000	Do.
Lombardy.	Milan.	4,500,000	80,000	5,000,000	Kingdom of Italy.
Papal Governmt.	Rome.	2,000,000	13,000	3,000,000	French departments.
Two Sicilies.	Naples.	2,500,000	31,600	10,000,000	Regal despotism.
Venice.	Venice.	2,600,000	13,800	6,000,000	Part of kingdom of Italy.
Tuscany.	Florence.	1,250,000	7,600	2,500,000	Dukedom of France.
Parma.		300,000	1,440	850,000	Part of kingdom of Italy.
Ragusa.		56,000	352	100,000	Do.
Modena.		320,000	1,440	700,000	Do.
Malta.		150,000	128	Uncertain.	British colony.
Lucca.		120,000	288	275,000	Kingdom of Italy.
Monaco.		10,000	49	85,000	Do.
Marino.		5,000	32	7,000,000	Do.
Dalmatia.		40,000			Do.



## CLASS V....LESSON VI.

## OF ASIA.

Q. Is not Asia a very large and populous quarter of the world?

A. It is next in extent to America, and the most populous. It is considered by the learned, as the most ancient seat of civilization, arts, and sciences; and as the source of Egyptian and Grecian knowledge.

Q. How is it divided?

A. The nations that occupy it, are more various and numerous than in all the other quarters of the globe: their names alone, would occupy a considerable space; and no book or books yet published, have given a complete account of them all.

Q. Give me such an account as may lead to a correct idea of their situation and circumstances?

A. Asia may be distributed into the northern, eastern, western, middle, and the inslandic or southern regions.

Q. What are the lines by which you make this distribution?

A. They are as follow:

The northern division is the most extensive, being nearly equal to all the rest; but it is not so fine a country, nor so celebrated, nor civilized; and therefore, not so interesting as the other parts. The extremity near the north pole is Siberia, under the dominion of Russia, which extends nearly in all parts, to the fiftieth degree of latitude; and in some places, as far as the 40th degree: next to Siberia south, are the

western and eastern Tartars, who consist of a great number of unlettered tribes; Monguls, Samoieds, Jakutski, Ostiack, Calmuc, and Usbec Tartars. Western Asia comprehends Arabia, Syria, Asiatic Turkey, Georgia, Circassia, Armenia, Bochara, and Kurdistan, or ancient Assyria. Eastern Asia contains China, the peninsula of Korea, and Japan.

The middle Asia may be divided into three divisions; Persia on the south-west, the eastern peninsula south-east; and the countries on the Ganges.

The fifth division, containing all the islands of the India ocean, which are yet unnumbered.

*Q.* What are the dominions of the Turks in Asia?

*A.* They at one period, held dominion over a great portion of Tartary, Georgia, Armenia, and Circassia: the Russians have dispossessed them of those countries, and hold under their authority to the borders of the Caspian sea, though the neighboring Tartars are rather quiescent than subjugated; the Arabians also owe but a nominal subjection to the Porte; and the petty states of Syria are in a similar state. The whole of Asiatic Turkey may then be reduced to the provinces of Caramania, Aladulia, Amasia, Natolia, and Palestine, part of Syria.

Persia, once so celebrated in sacred and profane history, is circumscribed in its limits, and reduced in its population: it no longer presents the powerful empire which could send a million of men to overwhelm Greece; it is cut into petty sovereignties, by whose rivalry the population is swept away, agriculture destroyed, and letters and the arts daily degenerating.

Hindustan, perhaps the most luxuriant country on earth, and with a people the most numerous, civilized, educated in a tranquil, superstitious subjection, the most simple in manners, and better fitted for the imitative arts than any on earth, has been for several centuries the prey of barbarian invaders, who have plundered the temples, and trampled upon the institutions of a people, whose principles forbid proselytism, and teach unbounded toleration. Hindustan has been successively ravaged by the Macedonians, Persians, and Arabians; repeatedly by the Tartars, under Jenghis Khan, and Timour, and by the Portuguese, Dutch, and worse than all, by the English....the greater part of Hindustan is now subjected to the latter.

Thibet is divided into northern and southern, the latter called Boutan, and extends from Hindustan to China; it is subjected to the Lama, a human idol, the innocence of whose rule, compared with the wickedness of the idols of civilized nations, entitles the superstitious Thibetan to comparative indulgence and charity.

China, which is considerably larger than Hindustan, is the most populous nation on earth, amounting to at least 60,000,000.

The eastern peninsula of India was in former ages, an empire under a people who are called Birmans, who, after being enslaved for two centuries, have within a few years emancipated themselves, and regained their independence, but continue to be engaged with the Siamese, their former oppressors. The Birman empire is divided from Bengal by Aracan, and extended to the promontary of Malacca, comprehending Malacca, Pegu, Siam, &c. and is divided on the

east from China by Cochin China, and Tonquin. The Birmans are separated from Hindustan by a lofty but narrow ridge of mountains on the west ; it is divided from Asam on the north.... The capital is Ava ; Pegu is south of Ava, and supposed to be the Golden Chersonesus of antiquity.

The islands of Andaman and Nicobar are on this coast. The Adamans were discovered only in 1789, and a colony was planted there by the British. The natives were woolly headed, stature about five feet, and wore no sort of garment or covering ; their number was very small.

The Malay country, or Malacca, is a peninsula, and the nature of the people of a character differing from every other that is known.... Their language is also very much admired for its harmony, and is in use on the continent, and over a great number of the adjacent islands, as Java, Sumatra, &c.

Q. What is remarkable of Asia beside ?

A. From thence, beside letters and science, all the religions that have yet prevailed among civilized nations have originated ; and the Mahomedan, which appears to have been a mixture of Jewish, Christian, and Hindu doctrines, arose in Arabia, a short distance from the Holy Land.

Q. What is the country called the Dekkan ?

A. The whole western peninsula of India, from Guzzerat to Comorin, was formerly called by that name, which means the *southern region* ; but the name remains to only a small portion of the country, and the Nizam of Golconda is the nominal sovereign, subject to England.

Q. How was the rest disposed of ?

A. The Malabar, or western shore, was occupied in succession from south to north, by the rajah of Travancore, the Zamorin or his descendants, the rajah of Cannanore, the Koorgs or mountaineers, the Nayrs, the Bedanore country under the Hyderee dynasty, lately destroyed by the British, and the Poonah Mahratta also taken under the British direction. The east side, and the interior to the mouth of the Kistna river, was occupied by various rajahs and chiefs, Mahomedan and Hindu; among whom were the Nabobs of Arcot, and the Carnatic, and rajah of Tanjore; thence along to the bay of Bengal are the five northern Circars.

The islands forming southern Asia are numerous, and among them are the two largest islands in the world. They have lately been classed into three divisions.

1. The eastern Archipelago, containing the Sumatran chain, Sumatra, Java, Timor, the Celebes, Borneo, the Manillas, the Spice islands of Amboyna, Gillolo, Tidore, Ternate, &c.

2. The Australasia, containing New Holland, which has been called the fifth continent (or Not-Asia) being three fourths as large as Europe.... New Guinea, New Britain and Ireland, New Caledonia, and New Zealand, New Hebrides, and Van Deiman's land.

3. The Polynesia, containing the Pelew islands, Ladrões, Sandwich, Society, Friendly, Navigator's, and Marquesas....the largest of which, Owhyhee, is 100 miles long.

The oceans and seas adjoining Asia, are the Northern, Indian, and Pacific, the Black sea, the bay of Bengal, the Arabian and Red seas, the Levant, and Archipelago.



The principal straits are Bhering's which separate it by 27 miles from America ; the straits of Malacca, of Sunda, Samatra, and Babelmandel.

The chief rivers are the Indus, Burrumpooter, Kistna, Jumna, Gogra, Coleroon, Caveri, Ganges, the Narbudda, Irrawaddy, Menan, Kianku, Hoan-ho, the Obby, Irtish, Yenesci, and Tigris.

The mountains are the Thibetean or Boutan, in which is a mountain of salt, the Shamoo, Alsh, Taurus, the Balla Ghauts or table mountains of Mysore, the Bahar mountains, and Caucasus.

Q. How is Arabia circumstanced ?

A. Arabia is separated by the isthmus of Suez from Egypt, which is part of Africa, and by the Red sea on the west ; on the south-east by the Erythrean or Arabian sea, which divides Africa from India ; and on the north-west by the gulph of Persia.

Arabia is divided into: 1. Arabia the Happy, which is the south west part between Mecca and the straits of Aden. 2. Arabia the Stony, or the small district on the Red sea, between Egypt and Palestine ; the chief town is Suez, and in this country are Mounts Sinai and Horeb, celebrated in the Holy Scriptures. 3. Arabia the desert, the inland country.

Mecca and Medina, are celebrated for being the holy places of the Mahomedans, and the places of the birth and death of their leader... Mocha is celebrated for its coffee, and Socotra, an island on the coast, for its aloes. The horses of Arabia are the finest in the world.

Q. What other countries are there in the neighborhood of Arabia ?

*A.* Armenia is north of Kurdistan, and Irak Arabia, in which is the celebrated Bagdad.

The ancient Mesopotamia, between the Tigris and Euphrates, is now called Diarbekir; the ancient land of Canaan, is the modern Syria on the Mediterranean.

The principal rivers are the Tigris and Euphrates; and the mountains are Ararat, and Libanus. The islands are Cyprus, Rhodes, Scios, or Chios, Mytelene, and Cos, whence came Cos lettuces.

Q. Have any changes taken place in Arabia?

*A.* The power of the Ottoman government has ceased in Arabia; and a new adventurer of the name of *Abdul Nachab*, has set up a new religious-standard, and made proselytes from the Mahomedan tenets; the Wahabies have taken Mecca and the celebrated stories of Mahomed; but their warfare has not yet closed.

Q. Where is the country called Cachemere situated?

*A.* It is situated in a delightful and extensive valley surrounding a double ridge of mountains in 34 degrees north latitude, a fine climate and a rich soil, watered by thousands of rivulets which contribute their stream to form the river Behut; the capital is Sirinagur or the city of God. The Behut falls into the Atock or Sirde river, which has its rise in the mountains that circumscribe Cachemere; Lahor and the Paunjaub are south of Cachemere; the mountains of Nagragaut on the east, and Cabone, Candahar, and Persia on the west.

## CLASS V....LESSON VII.

## OF ASIA.

Q. WHAT is the geography of China?

A. China is separated on the north from Tartary by the great wall; it is bounded by the Chinese seas on the south; and extends from the Pacific ocean to Thibet, is of about the same extent, and in the same climates as the United States.

The chief cities are Pekin, Nankin, and Canton; the rivers are Kiang and Whangho. Korea is subject to China. The largest of the Chinese islands are Formosa, and Hainan; the 36 isles of Leeoo-keoo, form a separate civilized nation, but subject to China.

Japan is a very large island, populous and independent; the island of Nippon is dependent on it, and several others.

Q. How is Persia considered?

A. Of Persia, the principal places, (for they are no longer cities,) are Ispahan, Shiraz, Tefflis, and Gombroon.

There are very few rivers in the whole country, and those small; the river Rucknabad celebrated by the poet Sadi, is a mere brook, frequently dried up during the summer. The Caspian sea is on the northern frontier.

Q. Give me some account of Hindustan?

A. It was divided into hither India, and India beyond the Ganges; but this division was at no time a judicious one, as many nations occupied the intermediate country formed by the great rivers, which contribute to the formation

of that celebrated river, and some both sides of it.

Hindustan was originally occupied by a people whose government was a refined superstition ; which made the priests supreme, not only as lawgivers, but as partaking, themselves, of the divine nature : it is the opinion of some of the most learned men, that the religious institutions of Egypt and Greece were derived from the Hindus : the same people still form seventeen twentieths of the population. The Mahomedan invaders, nevertheless subdued and established themselves in Hindustan, and their descendents still remain possessed of vast portions of the territory. The whole country, after the invasion by Europeans, was soon parcelled out among such chiefs as had resolution and address to adapt their measures to their ambition. Before the last great usurpation by the British in 1803, the most powerful and influential of the powers of that country stood nearly as in the statistical table annexed.

Q. Which are the principal divisions or people of India ?

A. The Mahrattahs, Seiks, Jaats, Rohillas, Patans, Rajepoots....in the middle India; on the coast, of Malabar, the Koorgs, Canarins, and Nayrs ; on the coast of Coromandel and bay of Bengal, the Ouriahs, Telingahs, Dekkannes, Bengalese, &c.

Q. Who are the Mahrattas ?

A. They are of the aboriginal stock of Hindustan, and owe their separate distinction of a nation to the invasions of the Mahomedans ; their founder was an enterprizing individual of the name of *Savajee* or *Shevajee*, from their con-

figuration of the divinity called Chiven or Cheva; they were a very powerful confederation, but falling under several leaders, they were divided, and wrought upon to destroy each other, until the whole are now nearly subjected to European masters. Their country extended over a vast portion of Hindustan, from Guzzerat to the bay of Bengal.

Q. Who are the people called Seiks ?

A. They are originally of the Jaats, an Hindu tribe, from whom they became schismatics, and contrary to the system of the Hindus, admit proselytes, though they make no other profession of religion, than that of a belief in the being of God ; a sectary of any other religion, believing in God, may become a Seik, only by conforming to their social habits and usages, among which is that of never cutting or shaving the hair from any part of their persons.

Q. What country do they inhabit ?

A. They are not established as a distinct nation little more than a century ; they first settled in the countries of the Paunjaab, Moultan, and Lahore....and now possess a country of 800 miles long, by 500 broad ; the city of Lahore had been their capital, but it has been several times wrested from them by the Dourannies ; Loorpoor and Loldong have been their capitals at various times. Their country is bounded south-east by the chain of mountains which range in a north-west direction from Napal, and continue to form the boundary of Cachimere ; on the northwest the country of Caboul ; on the south Moultan and Sirhind, to the vicinity of Delhi. They have extended their proselytism over great part of the surrounding countries....

For their population and revenue, see the statistical table.

Q. Who are the Rohillas?

A. They are a Tartar tribe who entered India as adventurers, at a period not remote, and becoming partizans in the local contests, soon became masters of the conquered.

Q. Whence is their name derived?

A. From *Roh* the name of a province in Afghanistan their original country; that territory which they acquired in Hindustan, was called after them, Rohilkund. It consisted of a variety of territory detached from more ancient possessors, and at one period contained Allahabad between the Jumna and Gunga; from whence they were extirpated by the British during the viceroyalty of Hastings. They were the avowed enemies of the Mahrattahs, who connived at their destruction by the British.

Q. What is their present state?

A. Only the small country of Rampoor now remains of all Rohilkund.

Q. Who are the Jaats?

A. An Hindu tribe, who upon the decline of the Moguls, seized upon Agra; the Rana of Gohud (destroyed by Hastings) was of the Jaat tribe; this country was called Bundailcund; being oppressed by the British and Mahrattahs, they have fixed upon Uktowah as their capital.

Q. Who are the Patans?

A. They are of the same original stock as the Rohillas, from Afghanistan; their chief place is the city of Mow, near Furrokaabad: they had a temporary celebrity under their chief Mozuffur Jung; but at this time they are no otherwise distinguished than as forming with the Rohillas

the finest soldiers of the Mahomedan cast in the armies of their British conquerors. They very much resemble our American Osage Indians, are of a light yellow complexion, with fine features, eyes, and teeth, handsome, tall, and muscular.

Q. Who are the Rajepoots?

A. They are Hindus of the second or military tribe, whose descendants became so numerous as to form a very considerable nation.

Q. What is the situation of their country?

A. They are divided under chiefs too numerous for notice; but the principal of them are the rajah of Joudpour, about 120 miles S. W. of Agra, and on the river Pudder, which falls into the gulph of Cutch; the other, the rajah of Jeypour, about 80 miles east of the former on a branch of the river Chumbul which falls into the Jumna.

Q. What part of Hindustan is called the Carnatic?

A. It is all that range of coast from Cape Comorin to the delta of the Kistna river, commonly known by the name of the Coromandel coast; it is about 1000 miles from north to south, and of an irregular breadth, from 60 to 200 miles.

Q. To whom was it subject under the native powers?

A. It was originally part of the Dekkan or southern Hindustan, but was under various petty chiefs, before its subjection to the British; such as the rajah of Palnaud, nabobs of Angole, of Vellore, Arcot, the Carnatic Jaghire, rajah of Tanjore, nabob of Madura.

Q. Do not those chiefs remain?

*A.* Yes; but they are really governed by English officers, called *residents*, and are the administrators of their revenues.

*Q.* Is this country always called the Carnatic?

*A.* It is sometimes called the Payen Ghaut, to distinguish it from Balla Ghaut, or the table land of Mysore; the Carnatic being a vast plain at the foot of the very precipitous mountains of Mysore.

*Q.* What is the Mysore country?

*A.* It is in Hindustan known by the name of the Carnatic Balla Ghaut, and consists of a vast plain country on the summit of a range of mountains. It was originally governed by Hindus, but was taken from them by the celebrated Hyder Ali, from whose son Tippoo it was conquered a few years ago by the British. The chief city of the ancient government was Mysore, after which the country has been called; Hyder built the city of Seringapatam.

*Q.* What are the adjoining countries?

*A.* On the south and east the Carnatic; on the west the Malabar coast, and on the north the ancient Visiapour, and Poonah Mahrattah country, and on the N. E. the countries of the Nizam. Its extent, population, and revenue, may be seen in the statistical table.

*Q.* What is the Malabar country?

*A.* It is the west coast of the western peninsula, as Coromandel is the east; and contains a great number of petty governments. The rajah of Travancore is on the west side of the cape Comorin, next to which, north, is Cochin; then Calicut, or the country of the Zamorin, from thence the country along the coast for a considerable distance, is occupied by the ruder races of



men, called Nairs and Koorgs, the chief place of the latter is Coorwar, at the northern extremity of which is the island of Goa, held by the Portuguese; the country on the continent then assumes the name of Concan; and contiguous to that is the Poonah country; north of which is the Balagana, part of which owns the Nizam's authority; the country of Suratsucceeds, and Cambay through which the noble river Narbuddah rolls into the gulph of Cambay; and at the west side of the Peninsula of Guzzerat, the noble river Puddar falls into the Gulph of Guzzerat, or Cutch.

Q. What is Guzzerat?

A. A promontory formed by the gulphs of Cutch and Cambay, a very fertile country, under the Mahrattah rule, till subjected by the British in 1803.

Q. Does the Malabar coast terminate here?

A. Between the Narbudda and the Attock, Sind or Indus, there is a small territory called Jesselmere.

Q. Does what is called India terminate at the Attock river.

A. The little territory of Tata on the sea coast extends to the west of the Attock, and India is properly divided by a ridge of mountains which separate Tata from the Persian province of Meeran, which is at the entrance of the Persian Gulph.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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## CLASS VI....LESSON I.

## OF ASIA.

Q. WHAT of the island of Bombay?

A. It is the seat of the British government on the Malabar coast, but subordinate to the governor general of India, who resides at Calcutta. The island is small, but the territory annexed to it by the conquest of Mysore is very considerable. This island came into the possession of the British, as part of the dowry of the princess of Portugal, who married Charles II. king of England. Adjoining it is Salsette, an island wherein are some of the most extraordinary remains of antiquity in a cavern evidently wrought by human hands out of the solid rock ; and of an antiquity much greater than any existing history can account for.

Q. What is the country of the Nizam and who is he ?

A. The name is a title answering to the word lieutenant or deputy governor ; and was conferred by Nadir Shah, upon the first of the present race, a native of Samarcand, under the name of Nizam and Soubahdar of the Dekkan. He originally held the territory of Malwa, the present Mahrattah country, Oude, Guzzerat, and the

whole peninsula, but successive revolutions confined him to the remotest realms of Bajapour, now Dowlutabad, Visiapour, and Golconda, of which the capital is at present Hyderabad.

Q. What is its position?

A. In relation to the other modern states, it is bounded on the north and west by the Mahrattahs, on the south and west by the Mahrattahs and Mysore; and on the south and east by Orissa and the five northern sircars, a narrow range of territory, a continuation of the coast of Coromandel which terminates with the Balasore river, in the bay of Bengal.

Q. What is the country of Orissa?

A. It is one of the three provinces which the English obtained from the Mogul; but only a small part of it was in their actual possession till 1803. It is neither so populous nor productive as the other two provinces.

Q. Is Bahar populous?

A. It is a flourishing rich province, in population, agriculture, arts, manufactures, and valuable mines; it is watered by numerous rivers, and extends on both sides the Ganges. Patna is the capital of Bahar; as Balasore is of Orissa.

Q. What is Bengal?

A. It was in ancient times, an independent country, with a distinct language, and on account of its fertility was called the Paradise of nations; and is now one of the most fruitful, rich, and populous, in Hindustan. The ancient capital was Moorshedabad, but upon the usurpation by the English, the town of Calcutta became the seat of power, and is now the actual capital of all Hindustan.

Q. What are the countries adjoining Bengal?

*A.* On the sea coast is Arracan, a petty nation alternately dependant on, or in revolt against the Birmans. The immense river Burrumpooter divides Bengal from Asam ; north of which is Coos Bahaar, conquered by the English in 1792 : the range of mountains that divides Bengal from Boutan or Lower Thibet, begins there, dividing it from the valley of Nepaul. These mountains go in almost a direct line, north west, to Cachimere. On the west, Bengal is bounded by part of Orissa, and a considerable part of Bahar.

*Q.* What are the countries which bound Bahar?

*A.* The charming countries of Allahabad and Benares, with a strip of the Oude country.

*Q.* Describe Benares and Allahabad?

*A.* Benares is the most sacred place of the Hindus ; it is their Mecca ; their Jerusalem ; there the most learned Bramins have various colleges, and thither thousands of pilgrims annually resort. Allahabad is at the confluence of two rivers, and is sometimes spoken of under the name of *Doaub*, from the words *dou* two, and *aub* water : the country on the ancient Oxus, is called the Paunjaub, or *five* waters. Allahabad presents vast ruins, which bespeak a very high state of civilization and arts, at a remote age.

*Q.* What other countries are adjoining?

*A.* South of Allahabad and Orissa are the Berar and Cutac countries, subject to the Bon-selah Mahrattahs, the capital is Nagpoor ; and further west, the small remnant of Candeish ; to the northward of both, is Malwa, and other countries of the Mahrattahs : the capital of Scindea is Ougein : the capital of Holkar is *Es-doree*.

Q. We have once more, I find, got into the middle of India....proceed with the other countries ?

A. North of Malwa, are, on the west side, Agimere, adjoining Guzzerat, subject to the Rajepoots and Mahrattahs ; on the north eastward is the Agra country, and still farther north east is Oude ; the capital is Lucknow, a very celebrated city, once the capital of the vizier of the Mogul empire.

Beyond Agimere is the country of Moulтан, and still further north, Lahore, or the Paunjaub ; which name signifies the *five waters* or rivers, and these are the rivers over which Alexander of Macedon passed in his wild and desolating scheme of ambition to conquer Asia. Those rivers are the Oxus, &c. of Alexander.

Q. What is the country west of Lahore or the Paunjaub.

A. Caboul, or what we have before noticed as the original country of the Rohillas and Jaats, under the name of Afghanistan. It is bordered by Persia on the south, Khorassan on the west, and Bochara on the north.

Q. Is this country remarkable ?

A. Yes....for a very warlike people, who have several times overrun Hindustan within the last 30 years : the people are sometimes called Turreen Oudals, and Abdallies ; and sometimes Douranies, from Douran a celebrated leader of theirs who seven times invaded India.

STATISTICAL TABLE OF ASIA...No. I.

Nations.	Capitals.	Population.	Extent. Square Miles.	Revenue in Dollars.	Government.
Asiatic Turkey.	Aleppo.	4,000,000	1,110,000	The revenue of these nations is not to be ascertained ; as none of them have any exact system of revenue or finance.	Despotism.
Asiatic Russia.	Astrachan.	3,000,000	3,550,000		
Indep't. Tartary	Tavar.	6,000,000	2,600,000		Human idolatry.
Persia.	Ispahan.	4,000,000	630,000		
Tibet.	Lassa.	3,000,000	240,000		
Boutan.	Dallamcotta.	2,000,000	76,000		
Napaul.	Catmandu.	1,100,000	220,000		
Assam.	Chergong.	3,000,000	54,000		
Meckley.	Munnypooora.				
Birmaun.	Umrappoora.				
Ava.	Avarcamny.				
Aracan.	Aracan.	12,000,000	1,220,000		Despotism.
Pegu.	Siriam.				
Upper Siam.	Sandeapooora.				
Lower Siam.	Juthia.	1,160,000	423,000		
Malacca.	Queda.				
Tonkin.	Tachoo.				
Laos.	Lanchang.				Petty Chieftains.
Cochin China.	Thoancoa.	3,000,000	173,000		
Cambodia.	Babanon.				
Chiampa.	Padram.				
China.	Pekin.	60,000,000			Despotism.
Japan.	Jeddo.	8,000,000	1,160,000		Despotism.

STATISTICAL TABLE OF ASIA...No. II.

Nations.	Capitals.	Population.	Extent. Square Miles.	Revenue in Dollars.	Government.
Gaur.	Candahar.	3,500,000	400,000		Petty chieftains
Bochara.	Samarcand.	6,400,000			—
Khorassan.	Herat.	4,000,000			—
Cachimere.	Sreenagar.	2,000,000			—
Saks.	Lahore.	9,000,000	23,600		Republic.
Moultan.	Debalpoor.	4,000,000			Petty Chiefs.
Sinde.	Tatta.	2,500,000			—
Cutch.	Radimpour.	2,000,000			—
BRITISH ASIA					
Bengal.	Calcutta.	17,000,000	2,141,400	90,000,000	British supremacy.
Bahar.	Patna.	9,000,000			
Orissa.	Balasore.	2,500,000			
Benares.	Benares.	4,000,000			
Oude.	Lucknow.	6,000,000			
Alahabad.		2,000,000			
Rajpoots.	Jeypour.	3,500,000			
Ghazipour.	Joudpour.	2,000,000			
Rampour.	Furruckabad.	2,000,000			
Delhi.	Fyzabad.	600,000			
Jaats.	Gohud.	56,000			
Dewlatabad.	Aurangabad.	2,600,000			

Nations.	Capitals.	Population.	Extent. Square Miles.	Revenue in Dollars.	Government.
MAHARATTAS.					
Poonah.	Sattara.	4,000,000		56,000,000	British supremacy.
Scindea.	Ougche.	7,000,000		14,000,000	
Holkar.	Endore.	3,000,000		18,000,000	
Bonselah or Berar	Nagpore.	3,000,000		8,000,000	
Agimere.		1,000,000			British supremacy, directing the native institutions, Hindu and Mahomedan.
Agra.		1,100,000			
Guzzerat.	Amedabad.	2,500,000			
Mysore.					
Under Hyder.		14,000,000	98,000	70,000,000	
Under Tippoo.	Seringapatam.	8,000,000	62,000	39,000,000	
Under a rajah.		600,000	1700	500,000	
Golconda.	Hydrabad.	10,000,000	103,000		
Cochin.	Coellin.	200,000			
Travancore.		640,000			
5 Circars.	Masulipatam.	1,000,000			
Carnatic.	Madras.	5,000,000			
Concan.	Soonderdroog.	1,500,000			
Canara.	Mangalore.	2,000,000			
Baramahl.	Oscotta.	280,000			
Koorgs.	Carwar.	600,000			
Nayra.	Ouvre.	400,000		1,400,000	



## CLASS VI....LESSON II.

## OF AFRICA.

Q. GIVE me some account of Africa?

A. This quarter of the earth is near 5000 miles long; and at its broadest part, about 4500 miles wide. It is divided from Asia by the Red sea, and Isthmus of Suez, and from Europe by the narrow straits of Gibraltar. This continent is broadest at about ten degrees north latitude, and from thence to the cape of Good Hope, narrows irregularly. The greatest part of Africa is in the hottest climates, being crossed by the equinoctial and the two tropics.

Q. What countries are most remarkable in Africa?

A. Egypt is the most celebrated on many accounts; but Africa is also very much celebrated in ancient history, on account of the commercial republic of Carthage, the rival of Rome: in modern history, as the seat of the piratical powers on the Mediterranean, and as the source of the disgraceful trade of slaves, carried on by European nations.

Q. How is Africa divided?

The North Eastern,	or	course of the Nile.
Eastern . . . . .		Zanguebar.
Southern . . . . .		Caffraria.
Western . . . . .		Negroland or Nigritia.
Southern . . . . .		Barbary.
Central . . . . .		The Desart.

The first of these divisions contains Egypt, or the mouths of the Nile....Nubia, and Abyssinia, and the sources of the Nile.

Q. What of Egypt?

A. This celebrated country is divided into Upper and Lower Egypt, and extends from the mouths of the Nile to the southward, about 700 miles, and embraces the country on both sides of the Nile, for an average of 200 miles. The Nile falls into the Mediterranean at several mouths, and the country owes its fertility to the overflowings of the river periodically.

Q. How is it bounded ?

A. By the Mediterranean on the north, the Red Sea east, the deserts of Barca on the west, and Nubia, Abyssinia, and Ethiopia on the south.

Egypt was in ancient times the seat of learning and philosophy, arts and refinement ; and the stupendous monuments which remain in the cities of Upper Egypt, and the pyramids of Lower Egypt, testify to the perfection of the arts, and mechanical and architectural science.

Egypt was long the resort of the Grecians, as a fountain of science ; but in successive ages it fell a prey to barbarism and superstition. It was conquered by the Macedonians, who built the city of Alexandria, which is still a very celebrated place. Cairo is the capital. It was invaded by the French in 1799, and conquered ; and re-conquered by the British. Its history has been much illustrated by the French.

Besides Cairo and Alexandria there are Rosetta, Damietta, and Bulac, considerable places.

In Upper Egypt the country of Seid, in which are the stupendous remains of ancient cities, and numerous pyramids.

Nubia and Abyssinia have been visited by some modern travellers, but excepting the circumstance of greater civilization than on the western coasts, nothing peculiarly interesting has been discovered.

Q. What of Zanguebar ?

A. It is the eastern coast of Africa on the Indian ocean, and comprehends from the south on the Mozambique, Mauruca, Magadoxa, Ajan, and Adel, which borders on Abyssinia ; on the south Monomotapa joins Mauruca, next to which south is Caffraria. On the western coast is Negroland, which begins from the south with Mataman, Benguela, Angola, Loango, Benin, Guinea, &c.—These latter divisions are the countries from whence slaves are barbarously seduced and betrayed away for traffic.

The Desert or Zahara, is the interior of these countries.

Q. What are the countries of the northern division of Africa ?

A. On the Atlantic is Morocco, under an emperor who also rules Fez ; both countries may extend 700 miles by 250 ; bounded west by the Atlantic, north by the straits of Gibraltar, east by Algiers, and on the south and south east by Belidulgerid or ancient Numidia and Taffilet.

The chief mountain is the celebrated Atlas, which extends from east to west the whole length of Barbary, and in which the rivers of the country rise. Those of Morocco are Malva, which is the boundary between Algiers, the Suz, Ontrabih, Laroche, &c. The capital is Mequinez in the country of Fez ; but it has Salee, a port on the Atlantic, once noted as the nursery and asylum of pirates.

Q. What is the country called Algiers ?

A. It is composed of parts of the ancient countries called Mauritania and Numidia, sometimes called Massyli. It is bounded on the north by the Mediterranean opposite to Spain, and is about 500 miles long by 200 broad.

Besides Atlas, there are other mountains, as Jibbel Auros, El Kallah ; its rivers are numerous but not spacious, they are Wedel Kibr, Wedel Haman, El Esner, El Haamase ; the chief city is Al Ghezir, which has been corrupted into Algiers, and has given the name we use to the whole country. There are other small towns, but in common with all the neighboring powers, they are very little removed from barbarism.

Q. What country adjoins Algiers ?

A. That of the Bey of Tunis, the country of the once flourishing and celebrated Carthage, and now one of the most wretched of nations. It is on the Mediterranean, and bounded east by Tripoli ; it is about 330 miles long and 150 broad.

The city, from which the country takes its name, is the only one worthy of notice.

Next to Tunis is Tripoli, composed of parts of the ancient Syrtica and Cyrene ; it is equally wretched with Tunis and less populous ; the country is upwards of 1000 miles long by 100 broad ; and the capital is the only place of note.

To the east of Tripoli is Barca, the ancient Cyrene, once famous for the temple of Jupiter Ammon, now a barren arid desert, though this whole country is susceptible of the finest cultivation, and formerly produced the greatest and most luxurious abundance.

All those states subsist by piracy, and to the scandal of the nations called civilized and Christian, many submit to pay them an annual tribute.

Q. What are the principal rivers of Africa besides the Nile ?

A. The Gambia, Congo, Zarie, Zebee, Niger, Senegal, and numerous others.

Q. Are the African islands numerous?

A. They are not so numerous as those of the other quarters of the globe, but there are still many.

Q. In the Indian Ocean there are Madagascar larger than Great Britain, being 1000 miles long and 250 broad, Mauritius, Bourbon, the Comora islands, and Socotro at the entrance of the Red Sea. In the south Atlantic are St. Helena and Ascension; and in the north Atlantic several groups of valuable islands.

The small islands in the gulph of Guinea called St. Thomas, Fernando Po, &c.

The Cape de Verds, first discovered by the Portuguese in 1460, the chief of which is St. Jago.

The Canaries, which are about 60 miles from Morocco; they are seven in number, among which is the celebrated mountain or peak of Teneriffe. The principal island is called the Grand Canary, and is about 150 miles in circuit ....capital Palma.

The Madeiras, which are about 60 miles north of the Canaries, and 100 miles west of Salee in Morocco. The islands beside Madeira are Porto Santo and Desolate Island. Funchal is the capital of Madeira.

The Azores, though placed here, do not properly belong to any quarter of the globe, being nearly equidistant from each....they are nine in number, of which Tercera is the most frequented.

In Africa there is no inland sea, and but one lake of great extent, that of Maravia. Besides Mount Atlas, those that are called the mountains of the Moon are lofty ranges.

## STATISTICAL TABLE OF AFRICA.

Nations.	Capitals.	Population.	Extent. Square Miles.	Revenue in Dollars.	Government.
Egypt.	Cairo.	5,000,000	140,000		
Abyssinia.	Gondar.	2,000,000	378,000		
Nubia.		Uncertain.	264,000		
Morocco.	Mequinez.	3,500,000	150,000		
Algiers.	Al Ghezir	2,000,000	30,000		
Tunis.	Tunis.	54,000	50,000		
Tripoli.	Tripoli.	75,000	100,000		
Barca.	Kolemair.	800,000	66,000		
Caffraria.			1,200,000		All Despotie.
Nigritia.	Uncertain		1,260,000		
Belindgerid.	Dara.		485,000		
Zanguebar.	Melinda.		275,000		
Angola.			38,000		
Congo.			172,000		
Loango.			50,000		
Island.					
Madagascar.			168,000		
				Uncertain.	

## AN EPITOME

OF THE

## ARTS AND SCIENCES.

## CLASS VII...LESSON I.

## OF AMERICA.

Q. AS it is fit that a knowledge of our own country should be our more particular concern and study, give me a suitable account thereof?

A. America is the largest of the four divisions of the globe, being about 9000 miles from north to south, and near 4000 in breadth. It is composed of two grand divisions or continents, made by nature; North and South America, which are joined by a narrow isthmus of land of 57 miles width, at Darien or Panama.

America was not known to the people of the other quarters of the globe, till Columbus, a citizen of Genoa, discovered it in 1492. Americus Vespucius, a navigator of Tuscany, by his voyages and address, contrived to give his name to this quarter of the world.

Q. Give me some account of South America?

A. This part of the American continent, was principally under the government of European nations, but in 1810 threw off their dependence on Spain.

The following are the grand divisions of the southern continent of America:

## WEST COAST.

Terra Firma, formerly subject to Spain.

Peru, . . . . . Do.

Chili, . . . . . Aborigines.

Patagonia, . . . . . Do.

## EAST COAST.

Paraguay, (Jesuits) Spain.

Brazil, Portugal.

Maragnan, (Amazonia) Aborigines.

Guiana, settled by France, occupied by the British.

Surinam, Do. Dutch, Do.

Besides the islands in the Pacific and Atlantic oceans.

Q. How is Terra Firma situated ?

A. It is an extensive country, containing nine large provinces....as Terra Firma proper, Darien, Carthagena, St. Martha, Rio de la Haca, Venezuela, Cumana, Paria, Grenada, and Popayan.

It is 1400 miles long, and 700 broad...the capital is Panama, on the South Sea, one of the finest harbors in the world. There the British began an establishment in 1810. In this province the Andes commence.

South of this division is Peru, which is divided into the three provinces of Quito, north ; Lima, middle ; Caraccas, south. In this country, are the celebrated cities of Lima, Cusco, and Potosi. Here also are the loftiest mountains in the world. Chimborazo is said to be near four miles high. Peru is 1800 miles long, by 600 broad.

Chili is divided into two parts by the Andes ; Chili proper, on the east ; and Cuyo the west. Capital St. Jago.



Patagonia is separated by the straits of Magellan from Terra del Fuego, and is about 700 miles by 300. The natives are in a savage state, as is the whole country to the neighborhood of Paraguay.

Paraguay is 1500 by 1000 miles, and divided into the provinces of Paraguay, Parana, Guaira, Urangua, Tucuman, and Laplata. The capital is Buenos Ayres. This country was not completely subjected to Spain. The religious society of Jesuits established there a sacerdotal government: but vast portions of the natives live totally independent. The lakes in this country are extensive, particularly that of Zaraya; Caracordes is 100 miles long. The La Plata is the largest river in the known world, and is 50 leagues broad at its entrance. It receives the Paraguay, Salt, Red, Pilcomoyo, Grand, and Uraquay rivers, and some hundred others.

Brazil embraces a very large space on this continent; being 2500 miles long by 700 broad. It is separated from Maragnan and Paraguay by a vast chain of mountains; and extends along the coast narrowly to the mouth of La Plata, and from thence along the shore of the Atlantic to the Maragnan (or Amazon) river, which is the next river to La Plata in magnitude, on earth. The capital is Rio Janeiro, but the seat of government is Bahia, or St. Salvador. Many fine rivers rise in the interior mountains. It is the richest and most prolific country in South America.

Maragnan (or Amazonia) is an inland country, very little known to foreign travellers.... The great river Maragnan rises in Quito and

runs 5000 miles in its course to the Atlantic, and receives the tribute of some hundreds of rivers ; it is a fine country, though close under the equinoctial.

Guiana commences with the Maragnan, agreeable to a treaty of extension of 1801. It was formerly bounded by the Arwary south ; and it extends north west along the coast to the river Oronoco.

Q. Are these the only territories that were held by Spain in South America, which you have noticed ?

A. Yes.....but they possessed also large territories to the northward.

Q. Which are they ?

A. North of Darien, are. Varagua, Costa Rica, Gautimala, Honduras, Yucatan, and some other provinces subordinate to these, and dependent on Mexico.

Q. Where does North America commence ?

A. This isthmus is the received boundary, commencing with old Mexico.

Q. What are the Dutch settlements ?

A. Surinam, or Dutch Guyana, as it is sometimes called, takes its name from the river Surinam, on which Paramaribo, the capital, is situated. Its length is about 350 miles from south-east to north-west, along the shores of the Atlantic ; but only 160 in breadth. New Middleburg, another town in this colony, is situated near the north-west extremity of it, and Demerara is a settlement on a river of the same name. The Dutch first settled here in 1663 ; but were expelled four years after by the English, whose descendents still form part of the inhabitants.... It was resumed by the Dutch in 1676, but great

- |               |                    |
|---------------|--------------------|
| 11. Virginia, | 15. Rhode Island,  |
| 12. Ohio,     | 16. Massachusetts, |
| 13. Maryland, | 17. New Hampshire. |
| 14. Delaware, |                    |

## TERRITORIES.

- |                 |                   |
|-----------------|-------------------|
| 1. Maine,       | 4. Indiana,       |
| 2. Columbia,    | 5. N. Orleans,    |
| 3. Mississippi, | 6. Up. Louisiana. |

To these must be added several tracts settled and unsettled in various parts of the union, which are under temporary forms of administration.

Q. In a former lesson you mention Florida.... to whom does it belong?

A. Florida was originally the name given to all the countries from Virginia to Mexico; but as the colonial authority of the Spaniards and French receded south, it came at length to comprehend only a range of territory south of Georgia, and extending to the river Perdido in the Gulph of Mexico.

The British took Florida from the Spaniards during our revolution, and extended the denomination of West Florida up the Mississippi, and over part of Louisiana; East Florida they called that promontory which is to be seen on the map opposite to the island of Cuba in the West Indies, and forming the west side of the Gulph of Florida....the east side formed by the Bahama islands. East Florida is at present held by Spain, but it is expected we shall obtain possession of it; as the people of West Florida in 1810, declared themselves independent, and the United States government, in order to secure their right, and to guard against a dangerous neighborhood, have occupied West Florida.

## CLASS VII...LESSON III.

## OF THE UNITED STATES.

Q. GIVE me some account of the geography of Georgia state ?

A. This state at one time occupied an extent of territory, one half larger than Great Britain and Ireland, larger than modern France, larger than the German empire. Two thirds thereof have been ceded to the United States to baffle an iniquitous fraud upon the government called the Yazoo speculation. Georgia now contains about 50,000 square miles, and is divided into 24 counties.

Liberty,	Chatham,	Camden,
Glyn,	Scriben,	Burke,
Brian,	M'Intosh,	Montgomery,
Wilkes,	Oglethorpe,	Elbert,
Franklin,	Washington,	Rutland,
Greene,	Hancock,	Columbia,
Effingham,	Jackson,	Jefferson, &c. &c.
Warren,		

The chief towns are Savannah, a seaport, and Augusta, the seat of the state government.

The boundaries are East Florida south, the river St. Marys being the line ; the Atlantic on the east ; South Carolina on the north, the line being the river Savannah ; and on the west the Chatahoochy or Apalachicola river, which separates Georgia from its ancient territory, now called the Mississippi territory, and passing East Florida, falls into the gulph of Mexico.

The climate of Georgia is as fine as any on earth, and is comprehended within the 30th and

35th degrees of north latitude, and 6 to 10 degrees west of Philadelphia.

Its rivers are numerous, as the Apalachicola, St. Mary's, Great and Little Sabille, Altamaha, Oconee, Ocmulgee, Flint, and various others.

The country is flat towards the sea, and has one vast swamp, in which the river St. Marys has its source ; it is called the Okenfonoka.... there are also several islands on the coast, which produce the finest ship timber....the plantations of cotton are numerous and productive.

Q. How is the state of Tennessee situated?

A. It was formerly part of the state of North Carolina, but was ceded to the United States in 1789, and became a state in 1796, the separating line extending from an intersection of the Virginia and Kentucky line on the summit of the Alleghany mountains, which bend to the southward, and thence approaching South Carolina, the south boundary strikes off directly west, as the north boundary in the same direction, separates Tennessee from Kentucky ; so that the state forms an oblong, the west end of which is the Mississippi, and the east the Alleghany mountains, the breadth of which is about 105 miles, and the length about 400. The climate and soil are fine, being between the 35th and 37th degrees north latitude. The rivers are numerous ; the principal of which are the Tennessee, one of the finest in the union, Cumberland, Clinch, Holston, and Broad rivers, with numerous others.

The country is mountainous in many parts, and the ridges very lofty, abounding with springs and minerals.

The extremes of the state only, are yet numerously peopled ; the centre is yet occupied by forests, but the encrease of population is wonderful....There are twenty counties in the state ; the principal towns are Knoxville, the seat of government on the Holston river, near the east end of the state, and Nashville on the Cumberland, near the opposite end. The counties are,

Greene,	Sullivan,	Washington,
Knox,	Hawkins,	Cocke,
Blount,	Sevier,	Robertson,
Jefferson,	Davidson,	Sumter.
Tennessee, &c. &c.		

Q. What is the situation of Kentucky ?

A. This state was formerly part of Virginia, the first settlements were made in 1773, and it was in 1792, admitted as an independent state into the union. It is about 360 miles long at the extreme ; and about 200 broad....between the 36th and 39th degrees of north latitude ; and is bounded on the E. by Virginia ; on the N. W. by the state of Ohio ; on the S. W. by the Indiana territory ; the beautiful and magnificent river Ohio forming the boundary on one side, being the separation from Virginia to the confluence of that river, with the Cumberland, Tennessee, and the Mississippi ; the form of the state approaching that of a wedge, of which the Mississippi washes the point ; Tennessee forming the south side.

The country presents various ridges of mountains, of which the Cumberland is the principal.

The rivers are numerous....beside the Ohio, the Cumberland, and Green rivers, there are the Sandy, Kentucky, Rolling, and Muddy rivers, with various others.

The climate is charming and temperate, and the soil fertile, and the best calculated for agriculture.

The state has encreased in population in a manner unprecedented. It contains forty-four counties, and the chief towns are Frankfort, Lexington, and Louisville, with various others.

Q. What of South Carolina?

A. This state is bounded on the N. and N. E. by North Carolina, in a very irregular measured line; and the Alleghany mountains, which form the frontier of Tennessee, touch it on the north, in a westwardly direction; the Savannah river, which rises in the Alleghany mountains, divides it to the Atlantic from Georgia. The form of the state is a pyramid with the top broken off; the Savannah river forming the base, the Atlantic forming one of the sides, which side is about 174 miles long; the Savannah boundary about 250, and the irregular side about the same length.

It extends from 32 to 35½ degrees north latitude: the land on the sea board is low, and in some places unwholesome; but rises in broken ridges to the interior, to a fine productive soil, and salubrious climate. Cotton is produced in the interior, and rice abundantly on the sea board.

This state is divided differently from the preceding; its first division being into nine grand districts or parishes, each of which are again sub-divided into counties: the following are the names of the districts:

Beaupont,	Georgetown,	Ninety-six,
Charleston,	Orange,	Pinckney,
Cheraw,	Cambden,	Washington.

The chief city is Charleston, between Cooper and Ashley rivers, which unite before it; it is a fine seaport: Columbia, on the Congaree river, about the centre of the state, is the seat of government; there are many other flourishing towns: the rivers are numerous, as the Santee, formed by the junction of the Wateree and Congaree; the Pedes, Edisto, Pacolet, &c. &c.

Q. North Carolina?

A. This state is divided from Virginia on the north, by a line which runs due east and west, from the Atlantic to the Yellow mountain, a branch of the Alleghany; where it is bounded west by Tennessee, formerly a part of this state. South Carolina forms the southern boundary, and the Atlantic the eastern.

It is between 34 and 37 degrees north latitude, between 1 and 7 degrees W. of Philadelphia. It is divided into fifty-eight counties.

Campden,	Bladen,	Iredell,
Currituck,	Duplin,	Surry,
Craven,	Edgcombe,	Stokes,
Carteret,	Tyrell,	Lincoln,
Chatham,	Onslow,	Perquimons,
Caswell,	Franklin,	Hertford,
Chowan,	Nash,	Hanover,
Martin,	Montgomery,	Hyde,
Meclenburg,	Moore,	Halifax,
Wayne,	Pasquotank,	Jones,
Warren,	Anson,	Johnston,
Orange,	Gates,	Randolph,
Wilkes,	Glasgow,	Rowan,
Sampson,	Grenville,	Rockingham,
Cabarrus,	Guilford,	Richmond,
Bertie,	Lenoir,	Rutherford,
Beaufort,	Northampton,	Robeson,
Brunswick,	Pitt,	Wake, &c. &c.
Burke,		



The rivers are numerous, the Chowan, Roanoke, Dan, Pamlico, Yadkin, Catabaw, &c. &c.

Raleigh is the seat of government, but it is a new, though an encreasing establishment. The other towns are Newbern, Edenton, Wilmington, Halifax, Fayetteville, Greenville, &c.

The extent of the state may be about 400 miles east and west, by 150 broad. The country 50 miles from the sea is flat and barren, but is principally occupied by its native woods. There are some swamps, particularly that called the great dismal swamp, which covers 400 square miles, and contains in it the Pamlico lake of ten by six miles.

In Cabarrus county a gold mine was discovered in 1804, in which a mass of pure solid ore of 50 pounds weight was found.

## CLASS VII...LESSON IV.

## OF THE UNITED STATES.

## Q. OF Virginia?

A. This state on the map presents the form of a vast pyramidal mountain, the base of which is North Carolina, and the windings of the Monongahela ; the Ohio forms a broken line on the north west side resembling the progressive series of ridges, which correspond with similar irregularities in the line on the north west formed by the Potomac. Beyond the Ohio is the state of that name, and upon the Potomac are the state of Maryland and district of Columbia. The northern extremity of Virginia is bounded by Pennsylvania. The Atlantic washes part of the coast of Virginia, and many of its rivers fall into the capacious bay of Chesapeake. Kentucky is separated from Virginia by the Great Sandy river, which rises in the Cumberland mountains, and falls into the Ohio 8 degrees long. west from Philadelphia.

Virginia is 350 miles by 280 broad ; it contains mountains of great height, the Blue Ridge, and Jackson's, and the Laurel mountain, are the highest ; the ridges run from N. E. to S. W. The rivers are numerous and large, among which are the Potomac, Rappahanoc, Powhattan, James' river, and Urbanna, which fall into the Chesapeake ; the Roanoke that penetrates North Carolina, the Great and Little Kenhawa which fall into the Ohio ; Shenandoah which falls into the Potomac, and the Yoheogeny and Monongahela which penetrate Pennsylvania, and joining

the Alleghany at Pittsburg form part of the Ohio, which there first assumes that name.

Richmond is the seat of government, and is a flourishing town ; there are numerous other cities and towns, among which are Norfolk, a fine seaport, Petersburg, Winchester, Staunton, Williamsburg, Fredericksburg, &c.

*Q.* Of Maryland ?

*A.* It occupies both shores of Chesapeake bay from the mouth of the Potomac. On the east side, which is called the Eastern Shore, it is divided by a measured line from the state of Delaware, which runs north to the boundary of Pennsylvania ; from which it is also divided by a measured line running from east to west, to the Virginia boundary. The Potomac is the remaining boundary, only where the District of Columbia is separated from it.

The bay of Chesapeake is indented with numerous smaller bays, into which numberless creeks and rivers discharge themselves ; the country is well calculated for agriculture and trade, but little attention has been paid to public roads to profit by those advantages ; the interior is, like the neighboring states, hilly.

The rivers are the Susquehanna, which rising in New York state, and winding its majestic but oblique course through Pennsylvania, falls into Chesapeake near Havre de Grace. The Patuxent, Patapsco, Choptank, Nanticoke, Pocomoke, are all navigable rivers.

The capital is Baltimore, a flourishing city, the third in size and population in the United States ; Annapolis is the seat of government. Frederick is a handsome town.

This state contains 19 counties ; on the Eastern Shore are....

Cecil,	Caroline,	Dorchester,
Kent,	Talbot,	Worcester.
Anns,	Somerset,	

On the Western Shore are....

Hartford,	Alleghany,	Calvert,
Baltimore,	Washington,	Charles,
Arundel,	Montgomery,	Mary's.
Frederick,	George,	

Q. Of Delaware state?

A. This state lies on the Delaware river and bay, by which it is bounded on the east, and separated from Jersey: a semi-circular measured line on the north rising from the separating line of Maryland and terminating in the Delaware river separates it from Pennsylvania; being about 100 miles long by 26 broad.

It is the smallest state in the union, and consists of three counties, Newcastle, Kent and Sussex. Dover, about the centre of the state, is the seat of government. The principal town is Wilmington, and next in consequence Newcastle, both on the river Delaware, and places of trade. The rivers and creeks are many, but none large. A canal is now cutting which will unite the navigation of the Chesapeake and Delaware through that state. Cape Henlopen is at the extremity of the peninsula on which this state stands, on which there is a light house maintained by the United States. The corresponding Cape is in Jersey called Cape May.

## CLASS VI...LESSON V.

## UNITED STATES.

## 2. Of Pennsylvania ?

A. This state has for its boundaries artificial lines, on the south, a right line from east to west divides in about 40 deg. 20 min. north lat. from Delaware, Maryland, and Virginia, all of which border upon it; a parallel line in 42 degrees north, divides it from New-York, till it intersects the head forks of French creek, where the line forms a rectangle, which terminates in lake Erie, and comprehends part of the coast of that lake, with Presque Isle in its limits; a line due north and south in 5 degrees 20 minutes W. long. from Philadelphia, or in 80 deg. 20 min. from Greenwich, separates it from Virginia and Ohio states; on the east side the boundary which separates Pennsylvania from Jersey is the course of the river Delaware, which rises in York state.

The breadth from N. to S. of Pennsylvania is about 150 miles; its length from E. to W. about 268. It is intersected with mountains and rivers; the Alleghany ridges, which insensibly ascend from the ocean to their summit, traverse the state almost diagonally, in various elevations, from north east, to south west, thro' Northampton, Bedford, Franklin, and Dauphin, counties, &c. The valleys between, forming most fertile tracts for cultivation. In those mountains rise the Susquehanna, Delaware, Schuylkill, Lehigh, Alleghany, Juniata, Conestoga, &c.

The state is divided into the following counties :

Philadelphia,	Franklin,	Greene,
Chester,	Birdford,	Beaver,
Delaware,	Huntingdon,	Butler,
Bucks,	Mifflin,	Mercer,
Montgomery,	Westmoreland,	Venango,
Lancaster,	Fayette,	Eric,
York,	Washington,	Warren,
Dauphin,	Alleghany,	Adams,
Berks,	Wayne,	Crawford,
Northampton,	Somerset,	Jefferson,
Luzerne,	Lycoming,	M'Kean,
Cumberland,	Centre,	Clearfield,
Northumberland,	Armstrong,	Potter.
Tioga,	Cambria,	

Philadelphia, the capital, is the largest city in the union, and one of the most beautiful in the universe ; and with the most orderly police.... It stands on the west side of the Delaware, and on the east side of the Schuylkill, the distance being exactly two miles. Lancaster, the largest inland town in the union, is the seat of the state government. Pittsburgh, on the head of the Ohio, is a very flourishing place ; the towns over the face of the state are numerous. Carlisle, Easton, Harrisburg, Germantown, Bethlehem, Northumberland, are flourishing towns.

Q. Of Ohio?

A. This state, the latest which has been received into the union, commenced its national career in 1802, a convention having been held, and the necessary laws passed. It is bounded on the east by Pennsylvania, on the south, by the Ohio river, which separates it from Virginia and Kentucky ; on the west, by a meridian line commencing at the mouth of the Great

**Miami river**, where it falls into the Ohio, to the southern end of Lake Michigan; and on the north, it is bounded by a line proceeding from the west point at Lake Michigan, due east to lake Erie. It appears that there was some mistake in the survey, and that Michigan extends further south than Erie, though laid down otherwise in the maps. All the countries to the north, west, and north west of this state, is now called Indiana.

The extent of this state is about 250 E. and W. by 200 broad; between 38 and 42 degrees north lat. from Philadelphia, 5 and 11 west. The country is uneven, hill and valley, with large plains in some parts; and is watered by numerous rivers....beside the lakes on which its north west and south west angles are situated, and the Ohio, which washes all its south side; the rivers are the Muskingum, Sciota, Beaver, Great and Little Miami, Miami of the lakes, Hockhoeing, Sandusky, Wabash, Cayuga.

It is divided into eighteen counties, and its population encreases in an extraordinary degree.

Butler,	Franklin,	Washington,
Hamilton,	Adams,	Muskingum,
Montgomery,	Sciota,	Belmont,
Warren,	Gallia,	Jefferson,
Greene,	Ross,	Columbiana,
Clermont,	Fairfield,	Trumbull.

Chief towns Chilicothe, Marietta, Cincinnati, Steubenville, Kenhaway, a French settlement, Schoenbrun, a German Menonist settlement on the Muskingum.

This state in 1790 was occupied by the Shawanese, Wyandots and Lenapi, or Delaware Indians—in 1802 was received as an independent

state, with upwards of 30,000 white inhabitants !

In this state are many remains of Indian antiquities, which embarrass enquiry....regular works in the manner of fortifications, some of them covering a mile in surface....indicating skill in the arts, much superior to any thing known among the aborigines of their times.

## 2. Of New Jersey?

A. This state has for its southern boundary the Delaware river and bay ; its northern boundary the Atlantic and the Sound at New York and up Hudson's river, where a line measured south-west thence to the Delaware river divides it from New York. It is situated between 39 and 42 d. N. latitude, and 73. 75 W. of Greenwich ; being about 160 miles long by 53 broad.

The country is unequal in fertility, and interspersed with mountains, and in some parts barren sands ; the middle and northern parts are fertile, well watered, and hill and dale interspersed. The rivers are the Rariton, Hackinsac, and Passaic, and the Hudson and Delaware on its boundary lines. This state consists of thirteen counties of unequal extent and population : they are.

Burgen,	Hunterdon,	Cape May,
Essex,	Sussex,	Salem,
Middlesex,	Burlington,	Cumberland,
Monmouth,	Gloucester,	Somerset.
Morris,		

The seat of government is Trenton, on the Delaware, about midway between the greatest length of the state ; besides which there are Newark, Princeton, Burlington, Bordentown, Elizabethtown, Brunswick, and Morristown, handsome towns, and several others.



## CLASS VII....LESSON VI.

## OF AMERICA.

## Q. Of New York?

A. This state, which approaches a triangular form, with two of the sides curvated inward, is separated by an irregular, but measured-line, from Jersey and Pennsylvania; on the south by a line measured northward from Connecticut, Massachusetts, and Vermont; at the extreme north point by the boundary line of Lower Canada, till it intersects waters leading from Lake Ontario, and along the centre of that lake, to Niagara, where the line continues in a south direction into Lake Erie, where it ends, forming a rectangle with the Pennsylvania line; but exterior to this boundary Long Island lies along the shore of Connecticut, but forming a part of New York state, as does Staten Island in the bay of New York.

This state is in a very flourishing condition, and improvement encreasing; the river Hudson, which rises in the ridge of mountains that stretch along parrallel to lake Champlain, is one of the finest in the union, and navigable to Albany, the seat of the state government. The city of New York is the most commodious and flourishing port in the union.

The extent of the state from the south to the Canada line, is about 350 miles, and the other two sides are about the same length, though varying in breadth near Lakes Erie and Ontario, and between Lakes Champlain and Ontario.

V In the mountains called the Highlands, which are but a continuation of the great ridge which is visible along the continent, the rivers of this

state and some of those of Pennsylvania have their sources ; among these are the Mohawk, Hoosac, Battenkill, Black river, &c. Beside Lake Champlain, there are several others in the state, as the Seneca in the Genessee country.

The state is divided into thirty two counties :

Kings,	Ulster,	Montgomery,
Queens,	Albany,	Delaware,
Suffolk,	Greene,	Genessee,
Richmond,	St. Lawrence,	Schoharie,
York,	Steuben,	Herkemer,
Orange,	Columbia,	Otsego,
Oneida,	Rensselaer,	Onondago,
Chenango,	Saratoga,	Cayuga,
Westchester,	Washington,	Ontario,
Dutchess,	Clinton,	Tioga.
Rockland,	Essex,	

## 2. Of Connecticut ?

A. This state is bounded on the east by Long Island sound, the other boundaries are artificial ; the line east, which is also the boundary of Rhode Island, runs directly north from Narraganset, to a line that divides it from Massachusetts, which runs from east to west till it intersects the line of New York. The extent of this state is not quite a degree north and south, the boundary between Massachusetts being the 42d degree, the extreme south-east point of the state is in 41 ; while the north-east is three-eighths of a degree narrower ; its longitude little more ; the eastern boundary about 44 miles long ; the western 76 ; the southern 106, and the northern 80. The country is not so fertile as in the southern states, but the people are industrious and simple ; there is much hill and dale, and the green mountains of Vermont are continued into this state. The rivers are the Connecticut,

which rises in Canada, and is the only large river in the state ; the others are the Pequot, Housatonuc, Shetucket, Tunxis, Naugatuc, &c.

The counties in this state are eight :

Hartford,	Middlesex,	Windham,
New Haven,	Litchfield,	Tolland.
Fairfield,	New London,	

Hartford and New Haven are alternately the seat of the government ; the others of note are New London, Norwich, Middletown, which five are denominated cities ; the country is settled to as great an extent as it appears at present capable of bearing.

#### 2. Of Rhode Island?

A. This state is bounded by Connecticut on the west, by Massachusetts on the north and east, and by the Atlantic on the south. The eastern and southern sides are irregular, and a considerable part of the state consists of islands and promontories, in the sound which leads up to Providence.

The state is not more than 86 by 35 miles in extreme length and breadth, and situated between 40 and 42 $\frac{1}{2}$  degrees north latitude. The interior is like the neighboring states, hilly and a barren soil. The sound or bay of Narragansett, which is thirty miles in length, affords a fine navigation up to Providence. The rivers are not numerous nor large, they are the Pocotuck, Wanesguahicket, and some others.

The state is divided into five counties :

Newport,	Providence,	Washington.
Kent,	Bristol,	

The chief towns are Providence and Newport, the former the seat of government.

## CLASS VII...LESSON VII.

**Q.** Of Massachusetts?

**A.** This state, exclusive of the district of Maine, is about 158 miles long, and by a diagonal line 93 broad at its greatest breadth, and 56 where narrowest. It is bounded in direct lines by Vermont, and New Hampshire, north; New York, west; and Connecticut south; but on the Atlantic side embraces an irregular promontory indented with harbors and bays, and several islands, as Nantucket, Martha's Vineyard, &c. Cape Cod and Cape Ann, forming the bay called Massachusetts.

The latitude is between  $41^{\circ} 30'$  and  $42^{\circ} 54'$  north, and the extremity is about five degrees east of Philadelphia.

Massachusetts contains twelve counties exclusive of Maine :

Suffolk,	Hampshire,	Dukes,
Norfolk,	Plymouth,	Nantucket,
Essex,	Bristol,	Worcester,
Middlesex,	Barnstable,	Berkshire.

The mountains are neither numerous nor lofty; the rivers are many but not large, they are principally the Agasoon, Housatonuc, Chickapay, Millers, and Deerfield rivers. The bays and islands are numerous and convenient, and from them are formed the hardest and most enterprising seamen in the world.

The islands beside those before noticed, are, Naushen, Nashamena, Pasquay, Pineguese, Heneemissit and Catatrunk.

The capital is Boston, the seat of the government; there are numerous other towns also, as

Salem, a flourishing seaport, Plymouth, Newburyport, Worcester, Bedford, Pittsfield, &c.

Q. Of New Hampshire?

A. This state is bounded on the west in its whole length by the Connecticut river, which separates it from Vermont. On the south it is bounded by Massachusetts, separated by a measured line from the Connecticut to the great bend of the Merrimack, three miles from which along its course continues to be its boundary to the Atlantic, upon which it has a coast of about twenty miles to Piscataquay harbor, that river forming the separating line from Maine to its source, and continued thence in a direct measured line north to the Canada mountains. Its length north and south is about 160 miles, and its greatest breadth being from Portsmouth on the Atlantic to Walpole on the western frontier, about 90 miles, and thence narrowing with the Connecticut river to about 20 miles on the Canada line.

The state is divided into six counties :

Rockingham,	Hillsborough,	Grafton,
Strafford,	Cheshire,	Coos.

The chief town is Portsmouth, which is a seaport and the seat of government, a very prosperous place; besides there are Exeter, Concord, Amherst, Keene, Walpole, Plymouth, Haverhill.

The country is mountainous and the highest in the northern states, among these the Sunapee, and Mooshelock, and the White Mountains, are the most elevated and noted. The country is like all others that are mountainous, well watered; and there are some considerable lakes in

the state, among which are the Umbagog, Wini-  
piiokee, and Osiapy ; the rivers are beside, the  
Connecticut, Merrimack, and Piscataquay, the  
Sauco, Androscoggin, Contoocook, Amoorioo-  
sac, &c. &c.

Q. Of Vermont ?

A. This state is separated from Massachusetts  
by a measured line running from the Connecti-  
cut river on the east to the New York line near  
Pownall, where it forms a rectangle to the north-  
ward to Poultney river, whence it proceeds along  
through the centre of Lake Champlain which  
divides it from New York, till it meets the Ca-  
nada line in 45 degrees north ; which latitude  
forms the northern boundary of the United  
States and Canada, till it touches the Connecti-  
cut river, which forms the whole of the eastern  
boundary.

The climate is much superior to the Atlantic  
states in the same latitudes, it being between 42  
and 45° north ; its length from Massachusetts  
to Canada is about 157 miles ; its greatest breadth  
about 94, and its least breadth about 36.

It contains eleven counties....

Bennington,	Franklin,	Orange,
Rutland,	Orleans,	Caledonia,
Addison,	Windham,	Essex.
Chittenden,	Windsor,	

This state in the early part of the revolution  
for American independence, was not a part of  
the confederation, but furnished very powerful  
aids and rendered important services to the  
common cause ; the troops of that state were  
called *Green Mountain Boys*, from a ridge of  
mountains which divides the state in the centre,

the verdant fertility of which is the origin of the name of the state *Vermont*.

The state is well watered ; numerous limpid streams fall into the Connecticut, but the largest are those which fall into Champlain, as the Onion river, Michisou, Noinosky, La Moille, Missiskoo, and Poosomac.

Lake Champlain and Lake Memphremagog are divided by the boundary line between Canada and this state ; the navigation from this lake through the river St. Francis to the St. Lawrence, is destined, at no remote period, to open a passage for the commercial industry of that part of the union into the ocean.

The principal towns are Rutland and Windsor, alternately the seat of the state government, Westminster, Manchester, New Fane, Burlington, Vergennes, &c.

This state is rich in minerals, and the industry, and enterprize of the population is proverbial, even among the people of the neighboring states.

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In the year 1812, that part of the territory of Louisiana, of which New Orleans is the capital, is to become a state of the confederation, making the eighteenth state. In a few years more the Mississippi territory will become a state.

## CLASS VII...LESSON VIII.

## OF THE TERRITORIES OR DISTRICTS OF THE UNITED STATES.

**ATTACHED** to the state of Massachusetts and united with its government, is the district of Maine, which forms the northern extremity of the United States. It is bounded on the south by the Atlantic, west by New Hampshire, east by Nova Scotia, the line of separation formed by the river St. Croix, and a line drawn due north from its source to the high lands, which separate us on the north from Lower Canada.... Maine has six counties; Washington, Hancock, Lincoln, Kennebec, Cumberland, and York.... The chief town, Portland. Its extent and population may be seen in the general statistical table of the United States, at the end of the geographical article.

2. The territory of Columbia, a district of 10 miles square, taken from the states of Virginia and Maryland on both sides of the Potomac<sub>2</sub> river, with the consent of those states, and formed into a separate government, of which congress has the exclusive jurisdiction; and it is the seat of the government of the confederation.

The city of Washington is the capital, founded about the year 1790. In 1804, the population of the district on both sides of the river, was about thirty thousand; comprehending Washington city, Georgetown, and the city of Alexandria, five miles distant from Washington.

3. The Mississippi territory is bounded by Georgia and South Carolina on the east, Florida on the south, the district of Orleans or



Lower Louisiana, by the Mississippi on the west, and Tennessee on the north.

4. The Indiana comprehends all the country west and south of the states of Ohio and Kentucky to the banks of the Mississippi, and the peninsula of land formed by the lakes Michigan and Ontario. It contains territory adequate to the formation of five or six additional states, and is growing in population. Various tribes of Indians still occupy great portions of Indiana. It is under a governor with definite powers.

Q. What of the present state of Louisiana?

A. It belongs to the United States, having been ceded by special treaty concluded at Paris, in April 1803, in full sovereignty. It is, by a law of congress, divided into two districts; the Lower, or that next the sea, is called the district of Orleans, of which the city of New Orleans is the capital, as well as of all Louisiana. This province, by a law of the 11th congress, is to become a state immediately, and a convention for the purpose met in September 1811, at New Orleans. The other province is called Upper Louisiana, and is under a governor....The capital of Upper Louisiana is New Madrid.

Q. What is the extent of Louisiana?

A. Its boundaries are not precisely determined; but it is known to be at least as large as the whole territory of the United States.

Q. In what parts are the boundaries undetermined?

A. On the west or New Mexico side; the presumed extent on the bay of Mexico, from the mouth of the Mississippi, is about 300 miles, some say more; on the other hand it is understood that the cession was made so as to

make the boundary on the side of the Floridas, at the Perdido river, beyond the bay of Mobile. On the northern frontier, there is also an uncertainty ; as our line by the treaty of Paris in 1783, is limited to the 49th degree of north latitude, or a line drawn from the Lake of the Woods, intersecting that latitude of the Mississippi.... and some think the Louisiana extends by the sources of the Colerado river, which falls into the gulf of California, along the South Sea, near the straits of Don Juan de Fuca.

Q. Has Louisiana many rivers ?

A. Yes....the Mississippi and Missouri are only inferior to the two great rivers of South America in magnitude ; but there are hundreds of rivers that fall into them.

Q. What may have been the population of Louisiana, when it came into the possession of the United States ?

A. The white inhabitants were about 50,000 ; the blacks about 39,000, independent of the native Indians.

Q. Should not Florida be considered as a territory of the United States ?

A. Undoubtedly it must ; but the manner of its organization is not definitely fixed ; no more can be said than that it is at present subject to the same government as the territory of Orleans, and that in 1812 it will probably be annexed to Orleans state.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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CLASS VIII....LESSON I.

Q. What are the British dominions in North America ?

A. They are Hudson's Bay, Labradore, Upper and Lower Canada, Nova Scotia, New Brunswick, Cape Breton, Newfoundland, and the Bermuda or Summer Islands.

Q. Are these countries settled by civilized people ?

A. Not all of them....the countries which surround Hudson's Bay, parts of which are called Labradore, or the country of the Esquimaux, new North and South Wales, are bounded on the north by unknown lands and seas about the north pole, by Canada on the south, the Atlantic on the east. Hudson's Bay extends from 52 north, beyond the arctic circle, and a company of English merchants have the exclusive trade in furs: they lay claim to all the country north of the United States, and in the same latitude to the Pacific ocean. There is every reason to believe that Greenland, heretofore considered as part of Europe, is actually a continuation of our continent.

Lower Canada is about 1200 miles long, by 330 broad ; and extends on both sides of the St. Lawrence river, from the boundary on the

north bank of the St. Francis river, to the ocean: the United States form the south boundary, and New Brunswick the south east.

Upper Canada has no definite bounds but that of the United States line, on the south; and the British set up a claim to all the continent north and west by the latitude of 60 north.

Quebec is the capital of all Canada, and is about 320 miles from the Atlantic; Montreal stands on an island 170 miles further up the river St. Lawrence, one of the largest rivers in North America. Newark is the principal town of Upper Canada; Queenstown is on the Niagara river, in which the celebrated falls of Niagara are.

The lakes and rivers of Canada are large and numerous.

Nova Scotia, in 1784, was divided into four separate governments: 1, New Brunswick, N. W. 2, Nova Scotia, S. E. 3, St. John's N. 4, Cape Breton N. E. It is separated from the United States by the boundary line, fixed at the peace of 1763. It abounds with capes, bays, and rivers, and is a fine country for fisheries; but the climate is very cold.

Cape Breton and St. John's with Anti Costi, and some others, lie in the gulph of St. Lawrence.

Newfoundland, about 368 miles long, and 240 broad, lies in latitude 46 to 52, separated from Labradore by the straits of Bellisle, and from Canada and Nova Scotia, by the straits of St. Lawrence. It is celebrated for its fisheries; which employ annually, from 350 to 400 English vessels, 3000 sail of small craft. Chief places are Placentia, Bonavista, and St. John's.

## CLASS VIII....LESSON II.

## OF THE WEST INDIES.

Q. GIVE me some account of that part of the world called the West Indies ?

A. The first voyage of Columbus in search of our continent, was made under the expectation of reaching the East Indies by a west course round the world ; and on his discovery of the first land he called it the West Indies, and all America was at first so called ; but at this time the name is confined to the numerous islands which are found in the great gulph or bay formed by the promontory of East Florida and Cape Orange, near the mouth of the Oronocco river.

Q. How are those islands divided ?

A. Into the Great Antilles, the Caribbee islands, and the little Antilles ; some groupes of them are otherwise designated, as those off the Florida coast are called the Bahamas or Lucayos ; those which are nearest South America are called the Windward, and those to the northward of these are called the Leeward Islands ; and another group of them the Virgin Islands.

Q. Which are the Great Antilles ?

A. The principal are Cuba, Jamaica, St. Domingo, and Porto Rico. The Little Antilles compose a group close to the Terra Firma, the principal of which are Curasso, Margarite, the Tortugas, &c. The Caribbees compose the whole range from Trinidad to Porto Rico, the principal of which are Antigua, Guadaloupe, Martinico, Barbadoes, &c.

Q. Are there no other American islands?

A. The Bermudas or Summer islands are situated in the Atlantic, 900 miles east of Carolina, and 3600 west of Greenwich; there are several of them, and in the form of a shepherd's crook.

There are also the Falkland islands on the east side of South America, but not colonized; in the South Sea there are the islands of Juan Fernandez, the Gallipagos, and various others.

Q. Are there not numerous islands in the South Sea?

A. The number is beyond present calculation; captain Ingraham, an American, in 1791, discovered a cluster of islands between 8 and  $8\frac{1}{2}$  deg. south latitude, and longitude from Greenwich 140, which he called Franklin, Washington, Adams, Hancock, Lincoln, Knox, and Federal, being seven in number, being each from ten to six leagues circuit.

A vast Archipelago also exists on the north-west coast of our continent, between 40 and 60 degrees north latitude, and 235 and 220 west longitude from Greenwich; among which are Nootka, &c. It is presumed that Louisiana extends to that archipelago, and an expedition was directed by Mr. Jefferson, President of the United States in 1804, for exploring that quarter, and executed by captains Lewis and Clarke.

Q. Have you any thing further to add on the elementary parts of geography?

A. Yes: in order to judge of the size of any country, it would be a good plan to compare the several parts of the world with each other, and even when it is wanted to judge of the size of any island, nation or state, it may be done by a

table of reference, which may be made to contain the superficial measure of those several parts; thus, if you wish to know the size of the island of Jamaica, you first find what is the number of square miles; you find it contains 6000; you then look for the size of another island, Sardinia is 6600.

These two data being obtained, you wish to know what proportion they bear to any state or part of the United States with which you are acquainted; you find that the state of Delaware is about 100 miles long by 26 broad, which multiplied one by the other gives 2600 square miles, or little more than one third of the size of Jamaica and Sardinia.

If you wish to know what relative proportion particular countries of Europe, Asia, or Africa, hold to the state of Pennsylvania, I look for their length and breadth, and find,

Pennsylvania about, 46,000 square miles.

England and Wales, 49,000

Ten provinces of Flanders, now			
united with France,		-	12,968
Helvetia, (19 cantons)		-	12,884
{	Batavia,	(French departments,)	9,540
	Liguria,		2,400
	Island of Sicily,		9,400

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Total number of square miles, 47,192

By which I find that Pennsylvania contains nearly as much territory as all those celebrated states and countries.

I also find that Pennsylvania is nearly double the extent of Portugal and of Ireland, or nearly as large as Portugal and Ireland together.

That Pennsylvania is as large as one third

of the old French empire, and nearly as large as one third of the old German empire.

I also find that the United States contain about 1,480,000 square miles, and exclusive of Louisiana, are larger by one third than European Russia, larger by one third than the Turkish empire in Asia and Africa, and larger than one third of all Europe; and that with Louisiana, our territory is nearly as large as half Europe.

Q. Maps are of different sizes, and it appears that in some maps a square inch will sometimes contain a thousand miles, but in others a square inch will not contain more than one mile, how is the difference to be understood?

A. You are right; but if you will observe that every map contains in some place what is called a *scale*; every map is projected or designed according to some scale; thus if a great extent is to be brought within a small space, the scale is made in proportion; the map is laid out into degrees and minutes; each degree has a given number of miles according to the nature of the subject; but as different countries use different measures, as some use leagues of 3 miles, others use geometrical paces, and some give 25 leagues to one degree, others 60 miles, and others  $69\frac{1}{2}$  miles; when there are degrees marked, it will be well to consider every degree as containing 60 parts or miles; take a slip of paper and a pencil, and place it to the scale on the map, and mark off the degrees with a pencil on the slip of paper, and then divide it into halves, fourths, or tenths, and then number the miles on your slip, apply it to your map, and you will obtain a sufficiently accurate idea of the extent, whatever may be the proportion of the map.



STATISTICAL TABLE OF THE UNITED STATES...No. I.

STATES.	Seats of the State Governments.	POPULATION.			Extent in Acres.	Revenue in Dollars.
		1790.	1800.	1810.		
Georgia.	Augusta.	82,548	162,686	252,433	29,796,000	29,000
Tennessee.	Nashville.	—	105,602	261,727	31,024,000	19,000
Kentucky.	Frankfort.	73,677	220,959	406,511	28,064,000	38,000
South Carolina.	Columbia.	240,073	345,591	414,935	19,270,400	113,000
North Carolina.	Raleigh.	393,751	478,105	563,526	27,443,200	194,000
Virginia.	Richmond.	747,610	886,149	965,079	47,468,800	350,000
Ohio.	Chillicothe.	—	45,355	230,760	26,670,000	—
Maryland.	Annapolis.	819,738	349,692	380,546	6,504,000	154,000
Delaware.	Dover.	59,094	64,273	72,674	1,267,200	31,000
Pennsylvania.	Harrisburg.	434,373	602,545	810,163	29,968,600	238,000
New Jersey.	Trenton.	184,139	211,149	245,562	4,950,000	98,000
New York.	Albany.	340,120	586,050	939,220	30,844,500	182,000
Vermont.	Rutland & Windsor.	85,539	154,465	217,913	6,232,000	47,000
Connecticut.	N. Haven & Hartford.	237,946	251,002	261,942	2,680,155	130,000
Rhode Island.	Providence.	68,825	69,122	76,931	694,300	38,000
Massachusetts.	Boston.	378,787	422,845	472,040	5,201,750	260,000
New Hampshire.	Portsmouth.	141,885	183,858	244,414	4,568,000	78,000

STATISTICAL TABLE OF THE UNITED STATES...No. II.

TERRITORIES.	Seats of the Territorial Governments.	POPULATION.			Extent in Acres.	Revenue in Dollars.
		1790.	1800.	1810.		
Maine.*	Portland.	96,540	151,719	228,705	6,000,000	Comprehended in Massachusetts.
Columbia.	Washington city.	—	14,093	24,023	10 miles sq.	
Mississippi Territory	Natchez.	—	8,850	40,352	36,780,000	
Indiana Territory.	St. Vincennes.	—	5,641	24,520	170,000,000	
Orleans.	New Orleans.	—	—	76,556		
Louisiana.	New Madrid.	—	—	20,845		
Illinois.	Detroit.	—	—	12,282		
Michigan.	Baton Rouge.	—	—	4,762		
Florida.†						

NOTE.—The revenue is only the amount of the old direct taxes, which were abolished...the whole taxation of the United States is now limited to the impost, which averages 10,000,000 of dollars per annum.

\* Maine, though denominated a territory from usage, is actually a part of Massachusetts.

† Florida being in the occupancy of the United States, is therefore placed among the dependant territories.

## CLASS VIII...LESSON III.

## OF GOVERNMENT.

Q. HOW is the earth divided ?

A. Into nations, and under various forms of government.

Q. What are the forms of government ?

A. The governments of the world may be described either as voluntary, or involuntary.... free, or subjected....or into republics, oligarchies, and monarchies.

Q. Whence do you derive the word republic ?

A. From the Latin words *res*, affairs....and *publica*, public. *Respublica*, in its correct sense, means a *commonwealth*, or a government established by *common consent* for *common good*.

Q. Republics then, it is to be presumed, are the voluntary governments ?

A. Evidently, such is the meaning of the word . . . but to deceive and enslave mankind, oligarchies, and even despotisms, have been sometimes called republics : Rome was called a republic alike after the expulsion of the Tarquins, and during the tyranny of Augustus and Tiberius. France was called a republic under the committee of safety, the directory, and the consulate. Venice was called a republic, though the government was totally independent of the people. Poland was called a republic, though it was governed by a king who was elected by nobles, and the people were all slaves.

Q. Are there no governments but republics, oligarchies, and monarchies ?

A. These three general denominations comprehend a numerous variety of other descriptions, which I shall attempt to enumerate, after premising that a government in which all mankind are equal in the view of the law, as they are in the eyes of God....where all men can alike aspire to honor and trust among their fellow men, as they can aspire to Heaven by the practice of virtue, is the only true free government....the only government that should be called a republic....every other form, whatever may be the name, if it has not these objects duly secured, is an unnatural subjection and enslavement of mankind, repugnant to justice, and to the word of God.

Q. What are the other forms of government ?

A. Our form of government is properly a democratic republic, as all the governments of the United States should be ; the people being the sovereign, and the word democracy being derived from the Greek words *demos*, the people....and *krateo*, to will or govern....that is, the power or will of the people operating government for the common and mutual good of all.

Aristocracy is that kind of government in which all power and authority is held by a class of persons to the exclusion of all the rest ; such were the republics of Venice and Genoa, and the Batavian republic. Those governments in which pecuniary qualification or property is requisite to give the right of suffrage, are aristocratical : some of the state governments are of this description.

Oligarchy differs from aristocracy only in the number of the rulers ; in the latter they are more numerous ; in oligarchies very few. The great-

er part of those governments which go by the name of monarchies, &c. are in fact oligarchies ; for although there is a king or an emperor, he cannot be supposed to do all that the duty of government requires ; hence he gives immense emoluments and powers to those who assist him to keep the rest in subjection....and these are in fact the oligarchs.

Some governments in the old world are called empires, kingdoms, monarchies, ecclesiastical states, electorates, dukedoms, principalities, and mixed governments.

Q. What empires exist at present ?

A. In Asia, there are the empires of China, of Japan, as was formerly that of the Great Mogul, or empire of Hindustan ; but the power of the emperor of the latter has ceased, since the British under the color of protecting the emperor *Shah Allum*, actually usurped his throne and power.

In Europe there are the empire of all the Russias ; the empire of Austria ; the empire of the Turks or Ottomans ; and in 1804, the government of France was changed from a consular or military republic, to an empire, under the name of the empire of the French.

Q. How was the German empire founded ?

A. The German princes claimed to be the successors of the Roman emperors in the western empire, but the imperial title had been in fact continued only from Charlemagne, who reigned in 800, and whose empire comprehended France, Germany, and part of Italy : on his death, the empire was divided among his sons.

Q. Whence is derived the appellation....Ottoman empire ?

A. Because its chief, descended of Othman, reigns in Constantinople, which is in Europe,

the seat of the eastern empire : the greater part of the Turkish empire is in Asia.

Q. What is to be understood by the distinction between the Eastern and Western empires ?

A. In the decline of the Roman empire at the end of the fourth century, the emperor Theodosius ordered that the empire should be divided between his two sons, Arcadius and Honorius : the first had the eastern, and resided at Constantinople ; the second had the western, and resided at Rome. The eagle with two heads, used by Austria, in its arms, bears a reference to the Eastern and Western empires, or two heads to one body.

Q. How long has the Russian empire existed ?

A. Only since the year 1727. Before that period the chief was called Tzar or Czar.

Q. What are the ecclesiastical governments ?

A. In Asia the government of Hindustan, in remote ages, was an ecclesiastical government of a most refined kind, and calculated, if unmolested, to endure forever. It was first shaken by the Mahomedans. The British have completed its overthrow.

Q. Was there no ecclesiastical government in Europe ?

A. The Papal government in Europe was of that character ; but not so mild nor so minutely organized as the Braminical ; the latter admitted no proselytes, nor persecuted ; the papal government, until within a few years, employed torture and cruelty to subjugate conscience ; persecuted those who differed from them, in this world, and damned them in the next....the papal power has now ceased ; and the Catholic religion divested of temporal power, has become

more consistent with the primitive principles of christianity.

Q. What was the effect of the abuse of the papal power ?

A. The reformation....by which the mild spirit of the gospel has partly prevailed, though there have been many abuses from running to an opposite extreme ; but conscience is no longer tortured where the government does not employ religion as an engine.

Q. Is there no other ecclesiastical government?

A. The Delai Lama in Asia only ; excepting that some European governments have combined with the state an ecclesiastical power for political purposes, to the disadvantage and disgrace of the christian faith.

Q. Which are the kingdoms of the world ?

A. None beside those of Europe are of much note. There are in Europe 13 distinct or separate kingdoms, so called, beside others united in one person. They are Portugal, Spain, Sicily, Sardinia, Sweden, Denmark, Prussia, England ; besides the kingdoms of Modern Creation, Bavaria, Saxony, Wirtemberg, Westphalia, Naples, and the kingdom of Italy.

There was a king in Poland, whose authority was abrogated in 1793, and his country partitioned between Prussia, Russia, and the Austrian emperor.

Bohemia and Hungary, are both called kingdoms, but are united in the person of the Austrian emperor.

Ireland was called a kingdom ; but in 1801, its parliament was abrogated, and a new system, called a union, formed, under the name of the United Kingdom of Great Britain and Ireland.

The king of Sardinia, having embarked in the war against France, was deprived of all his territory in Piedmont, and limited to the island which gives him his title.

Holland was converted into a kingdom, and so continued for a short time ; but the avarice of the merchants in violating the laws, caused it to be annexed to France in 1810.

Q. What are the republics ?

A. I before observed, that there are governments which should not be called republics ; but which cling to that title, indicating that the people wish for liberty, or that they may be deprived of the substance, only by giving them the name.

Q. Let us hear what they are ?

A. In Asia there is a nation called Seiks, which are better entitled to the name of a republican government, than most others. They are not a learned people, but composed of seceders from the Hindu superstition, and profess a liberal faith in one God.

The Mahrattah nation had also something of the republican character in its general association, though its laws were conformable to the Hindu faith. The habits of war have degenerated the Mahrattahs into monarchies, which is always the effect of war.

In Europe, the Helvetic republic alone exists.

Q. What are the electorates you mentioned ?

A. These were peculiar to Germany ; they had undergone a revolution within a few years ; the territory of some of the old electors being conquered and incorporated with France.

Q. Which were the old electorates ?

A. Three ecclesiastical ; 1, Mentz ; 2, Treves ; and 3, Cologne ; six secular ; 4, Bohemia ; 5,



Bavaria ; 6, Saxony 7, Palatinate ; 8, Brandenburg ; 9, Hanover.

Q. Which were the electorates subsequently ?

A. 1, Bohemia ; 2, Bavaria ; 3, Saxony ; 4, Brandenburg ; 5, Hanover ; 6, Baden ; 7, Wurttemberg ; 8, Hesse Cassel ; 9, Archbishop of Ratisbon.

Q. What relation did they bear to the government ?

A. They nominally elected the emperor, but were themselves sovereigns in their respective states. The government of Germany, was, therefore, an aristocratical confederation.

Q. In what respects did the princes, dukes, and others, differ from emperors and kings ?

A. In nothing but the title. Under all these names, no law prevailed but the will of the king, or prince, or duke, or of his immediate advisers, which brings them all under the proper character of monarchies or oligarchies.

Q. But what say you to the government of England, which is called a monarchy ?

A. It is sometimes termed a mixed government, because there is a king, an aristocracy, and a commonalty, ostensibly concerned in its operations.

Q. And is it not really so ?

A. In appearance it is so, but in practice the government of England is of the oligarchical character ; the king is but an instrument more or less passive in the hands of the oligarchy, or the ministers whom they nominate, though at times the king is a very influential member : the oligarchy is largely composed of the nobility ; but a number of those called commoners, who possess large estates or monied fortune, hold a

powerful influence ; the parliament is composed of the principals or the creatures of this aristocracy, while the people are cheated with the shew of elections of representatives.

Q. But could the government go on without a king?

A. That has been repeatedly proved, when James II. was expelled; when William III. was compelled to make conditions ; but particularly by the reign of Geo. III. who appears to have been in a state of insanity from 1798 to 1811 ; all the regal functions have been performed in the same manner as if he were in perfect health ; that is by the privy council or agents of the oligarchy.

Q. But how do monarchs and oligarchs contrive to rule over whole nations, contrary to the interests of those nations ?

A. When the people are ignorant, but especially when they are superstitious, they are easily deceived, superstition and deceit therefore unite ; the men who deceive to gain power, have an interest in keeping the people ignorant and superstitious ; a military force or corruption completes human subjection.

Q. There are two other denominations of government which I wish explained ?

A. You mean *Labcracy* and *Ochlocracy* ;—the former is where all the individuals vote and execute the law, and cannot exist but among a few people in a city ; the other is the government of a mob, and those who wish to revile representative *Democracy* confound the terms. There is yet another....*Gynocracy*, or a government of women.

## CLASS VIII...LESSON IV.

## OF JURISPRUDENCE.

Q. WHAT is jurisprudence ?

A. It is the science of law ; the knowlege of the laws, and the administration of justice according to their principles ; derived from the Latin words *jus* (juris) right, and *prudentia* knowlege or skill.

Q. Wherein do we differ in our jurisprudence in the United States, from foreign nations ?

A. The principles of our jurisprudence are not original, nor such as the general intelligence of the nation would seem to call for ; they are too complex, too much dependant on precedents derived from ages and situations no way analogous to our country ; they are uncertain, and involved in a technical obscurity, repugnant to reason, and subversive of the true ends of justice. Our jurisprudence has not yet arrived at that degree of perfection, which would seem to be the necessary effect of our excellent system of government.

Q. Whence does that happen ?

A. It has arisen from the nature of our original settlement in this country ; from the difficulty of altering long received habits ; and from the influence of interest and prejudice in a great measure, which render it preferable to bear the partial evil rather than risk what might be worse on a change ; but particularly from the general deficiency of education.

Q. How do foreign nations distinguish the principles of jurisprudence ?

A. Nations such as the Mahomedan and Hindu, make their religious codes the bases of their jurisprudence, and their priests are also their lawyers. Some nations of Europe have various kinds of jurisprudence, applicable to particular cases ; they divide it into three branches, the law of natural right of nature or the law of nations, the civil law, and criminal law.

Q. What is the law of nature ?

A. That which reason and nature have taught mankind....such as the power which parents possess over children....the right of resistance against wanton violence....the right of property duly acquired....the right of free will and opinion on all subjects.

Q. In what does the law of nations consist ?

A. This law is very vague and contradictory, and has ceased to be regarded among nations, for it never has been formed into a code, nor formally agreed upon by governments : it is principally made up of collections of maxims from ancient codes, the commentaries and opinions of learned men published by themselves ; and of certain treaties and compacts in which several powerful nations have at times concurred, such as the treaties of Westphalia, and the armed neutrality, all of which have been violated by those who had originally concurred in them, every powerful nation setting them at naught when suitable to its policy.

Q. What is the civil law ?

A. The words *civil law* are derived from the Latin words, *lex*, the law, and *civilis*, appertaining to a city or state. Those political regulations, which were found, on experience, to be necessary to the welfare of a city or state, were

by degrees formed into a code, and were called the civil law. There is however a technical meaning of the terms civil law, applied to the laws resorted to in particular courts, in different countries, this is the modern civil law, which is but a collection of fragments from the written opinions of Roman lawyers, compiled from the edicts of various Roman emperors; and which were found soon after the revival of letters in Europe at Amalfi, a city of Italy, and adopted by various nations of Europe.

Q. Are these the only descriptions of the civil law?

A. No....the law peculiar to any country, is called its civil law. Suits or actions at law are also called *civil* or *criminal*, according to their nature; civil actions are those which arise between individuals on money transactions, or any other to which crime is not attached by law; the latter are called criminal actions. The municipal law is also part of the civil.

Q. Is the Roman civil law very generally received?

A. It is not acknowledged out of Europe, excepting only so much as enters into the practice of our courts, under the forms of proceeding in maritime affairs, and in what is called the common law.

Q. It appears that there are several kinds of law....will you give some account of them?

A. In Europe generally, there are a variety of codes or systems of law....the greater part of which are founded on the civil or Roman law.

In England, to which our law institutions bear a close analogy....there are the following:

*Statute Law*, or acts of parliament.

*Common Law*, which consists of customs.... precedents of the practice on those customs.... opinions of judges or lawyers on those customs ....and the decisions in particular cases.

*Civil Law*, before described ; but under which is often understood as included;

The *Canon* or ecclesiastical law, which is the law of the Church, founded on the edicts or canons of the popes and councils—of synods and fathers of the church.

*Maritime Law*, or the law concerning navigation on the high seas.

The *Law* of treaties.

There are in several countries laws peculiar to each, such as the *Forest Law*....which relates to the preservation of the forests and the chase.... there are also *Game Laws*, by which only certain privileged persons are allowed to kill wild animals or bear arms.

Q. 'Do our institutions embrace all these kinds of law ?

A. No....but they have all had an influence on them....our statute law, is the constitution of the United States, and the laws of congress consistent therewith; these, and the law of treaties, are called the supreme law of the land.

Of equal force with these, when not contradictory to them, are the laws of our several states, which are equally binding within each state; as the laws of congress, but do not bind the citizens out of the states in which they are law.

In every state there is a portion of the common law, which existed while our states were colonies of England....but this common law

differs in several states, and what is law in one state, is not in another : this is a great evil.

We have no civil law, nor canon law established under our government, but such as enters into the common law of some states, excepting only, our maritime law, which is also regulated by the statute law.

Our martial law is also statute law.

Q. What is the character of the civil law ?

A. It is considered by professional civilians, as the natural law of states ; essential to the statesman and negociator ; that modern history is unintelligible without it : its spirit is arbitrary : at Rome, where it was established, the law of persons was the black code of personal slavery ; it was subtle and uncertain, and composed of good and evil principles : for example of the former, by the civil law all property was divided equally among the children of both sexes ; but in criminal accusations, the accuser and accused were never confronted, and the judge alone, decided upon the evidence. The Roman code presents nothing but sanguinary horrors, the iron crown, the bed of torture.

Q. What influence has the form of government upon legislation ?

A. The principles of the different forms of government are seen in the spirit of the laws... they may be thus arranged :

<i>Principles of gov't.</i>	<i>Characteristics.</i>	<i>Legislation.</i>
MONARCHY.....	Ignorance—force.....	Human vengeance.
ARISTOCRACY.....	Opinion—superstition.....	Revenge.
DEMOCRACY.....	Reason—Philosophy.....	Prevention of crimes.

## CLASS VIII....LESSON V.

## OF POLITICS.

Q. WHAT do you mean by the word politics?

A. It is, in a general sense, the knowlege of the whole condition of countries and governments ; in a limited sense, it is the knowlege of the various interests and circumstances of our own country.

Q. Politics, then, would seem to require knowlege very extensive and various?

A. Assuredly, to a perfect politician no branch of human science or art, no species of erudition, no experience, can be useless.

Q. What is principally necessary for a politician to know?

A. First of all, morals and virtue : in a government like our own, a perfect knowlege of the natural and civil history of the several states, their geographical situation, extent, natural productions, population, arts, commerce, and public institutions ; the form of each government, the variations which subsist between the institutions of one state and another ; the changes which have been made in public institutions ; the spirit of the laws ; the moral and mental character of the people ; the degree of attachment or indifference to their institutions.

Q. In what does general politics differ from this, which, though it requires so much knowlege, you call limited?

A. In this, that after obtaining a due knowlege of your own country, you should endeavor



to obtain an equally correct knowledge of other countries : and of ancient and modern history.... the laws of nations....the power, interests, and policy of other governments, and the position, extent, and productions of other countries ; their good and bad laws ; their virtues and vices ; their good and bad fortune, and the causes of them.

Q. What is the object of the study of politics ?

A. To the citizen of a free state, the principal use of political knowledge, is that he may be able to contribute his share to the preservation of its freedom ; to guard against the ambition of foreign nations, and against ambitious men and evil institutions at home, by which the peace and liberty of his country may be endangered.

Q. Is not the object the same every where ?

A. Under governments not free, politics is a study with which the people have no concern ; and the object of those who apply to the study, is to qualify themselves for ruling or serving in subordinate stations of such governments. In states not free, able politicians are generally denominated statesmen, from their real or presumed ability in the government of states.

Q. What are the most important branches of practical politics ?

A. After the due study of history, by which a knowledge is obtained of the circumstances of nations, ancient and modern, what should be first principally considered is called statistics.

1. The topography of the country.

2. The number of cities, towns, and the proportion of cultivated land to the uncultivated land to the population.

3. The numbers of the population, which is the strength of the nation.

4. The progression of that population, the marriages, births and deaths.

5. The amount or produce of agriculture and husbandry.

6. Manufactures and useful arts.

7. The exports to foreign countries.

8. The imports, and the proportion which each bear to the other.

9. The finances of the country ; of what the revenue consists....direct taxes or impost ; the expenditures, whether frugal or extravagant.

10. Monied institutions....foreign exchanges.

11. Of the weights and measures....coins as a measure of value.

12. Roads, canals, bridges.

12. The seminaries of education.

14. The militia....the mercenary army....the navy.

15. The courts of law, whether organised in the best manner, or are there any abuses in the administration.

16. The manners and morals of the people.

Q. Are not these various objects comprehended under the denomination of political economy?

A. They are....and the able politician, besides a due acquaintance with all these circumstances of his own country and of others, must obtain a perfect acquaintance with the derivation of many institutions that now exist in society, under different modifications ; he must make himself acquainted with the civil and maritime laws of other countries : their negociations, embassies, wars, treaties and alliances.

Q. Is not the spirit of party a very important part of political study ?

*A.* This has been referred to already, in noticing one of the objects of policy to be to guard against ambition ; the spirit of party, always arises from one or other of these causes....lust of power....personal ambition....envy of rivals....avarice....or corruption....and is common to all forms of government ; the autocracy of Russia as well as the democracy of William Penn.

*Q.* Is not this contrary to the received opinion, that party is known only to free governments ?

*A.* It is contrary to a very frequently asserted opinion ; but nevertheless it is true. In monarchies, the spirit of party is limited to the courtiers, those who are at the head of various departments, such as those of the state, of the army, and of the courts of law ; and it is conducted by every species of treachery and intrigue ; it acts unseen, and is directed to abject servility and flattery of the chief ruler, whether emperor, king, or general ; but in free governments, while intrigue is not absent, it acts more openly upon public opinion, by eloquence, by factious combinations, by employing the press to disseminate truth, or by perverting it from its pure purposes.

*Q.* But how does it act in aristocracies ?

*A.* There it prevails secretly among the rivals ; each seeking to engross to himself the predominating influence ; but in neither have the people either weight or interest.

*Q.* But has not the evil equal scope in popular governments ?

*A.* By no means ; in republics the spirit of party has too large a surface to be often acted upon in secret, or by direct corruption ; and those who seek power or favor from the people, are com-

pelled to pursue the paths of virtue, and to establish a reputation for morality and integrity; so that popular government in this important point is superior to all others, that no other holds out rewards to real virtue; while popular government makes virtue the first consideration in the choice of its agents.

Q. But will history sustain this opinion?

A. All history supports it; the history of the reign of Louis XIV. and XV. of France, and of George III. of England, prove it. Under both the *Louis's* concubines and cardinals were the leaders of party; the courtesan governed the king by sensuality; the cardinal by flattery; and as either passion predominated, the party of the priest or the prostitute prevailed. The banishment of the protestants, the alliance of France with Austria in 1756, and the desolation of the Palatinate, were the effects of such party spirit in that court; and it was the ascendancy of the royal mistress, which in each case decided the question; on one side was ranged by accident the clergy, the nobility, the king's wife, the principles of humanity, and the interests of the people; on the other side the king's concubine and her party, and they prevailed.

Q. From what authority do you derive your opinions on the spirit of party in the English government?

A. From many....but particularly from Dodgington's Diary....Chesterfield's letters...and Oldfield's history of the boroughs; all authentic works.

Q. But was there any thing like this in ancient times?

*A.* Yes; in all times; in Roman and Grecian history as well as in modern; the Gracchi who were the vindicators of the rights of the poor citizens, were destroyed by the avarice and vengeance of the Patricians; after the death of Alexander of Macedon, his generals, actuated by the spirit of party, divided against and destroyed each other; while in Athens the spirit of party was that of competition; never did sects discover less turbulence or animosity, nor neighbors fewer jealousies; an avenue of lime trees, or a thicket of myrtles, separated the dominions of rival systems, and served as boundaries for the empire of opinion. It is true they committed great crimes, they banished the most virtuous men, as Aristides and Cimon; and murdered some of their greatest benefactors, as Socrates and Miltiades.

*Q.* Is not the spirit of party considered by some as necessary in free government?

*A.* Some celebrated men have so considered it. Beccaria says that "in every human society there is an effort continually tending to confer on one part the height of power and happiness, and to reduce the other to the extreme of weakness and misery"...it would seem that the spirit of party must necessarily preserve the medium.

## CLASS VIII...LESSON V.

## OF METAPHYSICS.

Q. WHAT do you understand by the branch of philosophy called metaphysics ?

A. A science sublime and more difficult than physics or natural philosophy.

Q. In what do they differ ?

A. Physics treat of things natural, or which are perceptible to the senses, and of which you can judge by experience, and by examination.

Metaphysics comprehend all that is abstract, and of which the reason can determine only by reasoning or analogy. Metaphysics are independent of material things, the senses can have no experience of them, but by reference to sensible things....thus theology, or the study of God, angels, and spiritual things (separate from the holy scriptures) is a part of metaphysics; the opinion that the moon and other planets are inhabited like our world, is a metaphysical opinion.

## OF THEOLOGY.

Q. What is meant by Theology ?

A. It is the knowledge or study of the nature and the attributes of God ; from the Greek words (*Theos*) God, and (*logos*) word or description.

Q. How is this study conducted ?

A. Theology is of three kinds; 1, Intellectual, or as it relates to the perceptions and reasoning of man; 2, Natural, or as it relates to the visible creation, and the beauty, order, and harmony of his works; 3. As it relates to man in his present and future state, and this is called religion.

## OF RELIGION.

"Be particular not to neglect religion in the education of your children. In vain will you endeavor to conduct them by another path. *If they are dear to you, if you expect from them credit and comfort*, from religion must be derived their happiness and *your own*"

FATHER GURDIL.

Religion! soother of all our keenest sorrows, source and refiner of all our real joys! shed thy heavenly influence on our souls; direct, animate, and crown all our pursuits; pervade and consecrate all our thoughts, words, and actions; or we can never answer the design of God in our creation; we fall short of true happiness in this life, and we sink to the completest wretchedness in that which is to come.

*A.* What is religion?

*Q.* A worship rendered to the Divine Being, after that manner we conceive to be most agreeable to his will, that so we may procure his favor and blessing, and avoid his displeasure.

*Q.* Is religion universally practised and the same every where?

*A.* Man is said to be a religious animal, because his faculties enable him to see and wonder at his existence, and to adore the creator; but in different ways in various countries, though all men adore the God who is our creator, their religion or mode of adoration differs in form, and in some important practices and precepts.

*Q.* Whence has this difference arisen?

*A.* From ignorance and superstition.

*Q.* What is superstition?

*A.* It is zeal acting wrong under the belief of acting right.

*Q.* How do you discriminate religions?

*A.* Into true and false, or pure and corrupted.

Q. What is true religion ?

A. It admits of two divisions....1. The religion of nature....2. Revealed religion.

Q. What is natural religion ?

A. That reverence and love which springs spontaneously in our bosoms, upon viewing the glory of God in his works in the heavens and on the earth, and on the waters, and in the faculties with which he has endowed us.

Q. What is revealed religion ?

A. It is that which is contained in the Old and the New Testaments, and is divided into two parts, the Jewish and the Christian dispensations.

Q. What is the Jewish dispensation ?

A. The law given by Moses to the tribes of Israel, and to be found in the Old Testament.

Q. What is the Christian dispensation ?

A. That which is delivered in the New Testament, by Jesus Christ and his apostles.

Q. Is the religion of Christ distinguished in any manner above others ?

A. It is, by the benignity and purity of its precepts....by its inculcation of patience, temperance, fortitude, and justice....by teaching mankind that virtue alone is acceptable to God, and that the lowliest of his creatures may aspire by virtue to equal glory and bliss in Heaven, with the loftiest and the most powerful of this earth ; but above all other things it is distinguished by this precept : " do unto others as thou wouldest be done unto." It forbids war, and inculcates charity towards all mankind.

Q. What do you call corrupted religion ?

A. The greater portion of mankind are at present under the influence of impure religion,



which is of various kinds. The most extensive of these is the religion of Mahomed, which prevails most in Asia and part of Africa ; the religion of the Hindus or Bramins, which is believed to be the foundation of the Grecian and Egyptian mythology ; the religion of Fohi in China, and Bhuda in the Birman, Malay, and Siam empires.

Q. Are not these generally called by some other names ?

A. Yes ; it has been too much the custom, contrary to the charitable spirit of the Christian religion, to call those who were in error, idolators and pagans, and other injurious names, and to treat them with that contempt which is only due to fanaticism and intolerance.

Q. Whence is the Mahomedan religion derived ?

A. From an Arabian shepherd, who in the seventh century of the Christian era, set himself up as a prophet, and declared that he was the person promised to be the follower of Jesus Christ.

Q. What was his doctrine ?

A. It was a compound of the Jewish and Asiatic religions, with some of the abused principles or heresies of the early Christian Church, and a great number of sensual inventions of his own ; which were combined in a book called *Al Koran* or the *Koran*.

Q. Does this religion flourish ?

A. By no means....like all other religions it has undergone many changes, according to the interests or passions of designing men ; it has been split into sects, each of which made war upon the other, massacred, burnt, and put to

the torture, the people of whole regions, only for disputing some futile dogma ; but it has lately suffered a great shock from the *Wahabies*.

Q. What of these ?

A. Abdul Wahab, an Arabian adventurer, set up a new sect about the year 1780, and made numerous proselytes ; he took Mecca by storm in 1804, and his successor continues to prevail.

Q. What of the other religions of Asia ?

A. These are not to be described in so small a book.

Q. Of what advantage is an exact observance of religion ?

A. It inspires honesty, virtue, and charity ; it renders those who obey its principles happy and respected by their neighbors ; and it blesses families and nations when it is faithfully observed.

Q. Is not religion sometimes abused ?

A. Religion is in some parts of the world perverted to the worst of purposes....under the name of religion, wars, cruelties, and the most atrocious crimes have been perpetrated ; and its name has been employed, combined with that of the state, to corrupt and perpetuate the misery, instead of promoting the happiness, of mankind. It is too frequently made a cloak for the worst vices.

Q. What is most pernicious to religion ?

A. The blending of religion with politics, using it for avaricious purposes, for persecution, or to aid ambition. Religion is always abused and the people wicked, when the government meddles with religion.

## CLASS VIII...LELSON VI.

## OF MYTHOLOGY.

Q. What do you understand by mythology?

A. The mystical theology, which being interwoven with ancient history is essential to education, it being inseparable from a knowledge of classical learning, poetry, painting, sculpture, and even with the chronology of nations.

Q. Whence has it been derived?

A. It is more than probable that it was derived from Asia, as the correspondence between the Asiatic superstitious mythology are too much alike and particular to be derived from different sources.

Q. You suppose then, that it was not an invention of the Greek or the Roman poets?

A. With deference to long received opinions, I do not believe the mythology of the Greeks and Romans originated with the Greeks or Romans, though they certainly amplified the scope of the system, and enlarged the number of the imaginary divinities.

Q. Whence do you suppose it derived, and why?

A. I believe it originated in Asia, and that it is in fact only such a variation of the religious system of the Hindus, as would arise from the passage of such a system from one nation to another, and into others successively. My reason for believing this is, that not only the attributes of those whom the Greeks and Romans called their gods, agree with those of the Hindus, but there is a chronological correspondence, and an

astronomical, but that its existence has been ascertained to have been for several thousand years before the Greek or Roman nations had a name.

Q. Then the mythology is the religious system of the ancients ?

A. It is, and had its origin in a pure theism, which was innocent, perhaps virtuous, as every attribute of the divinity was adored, instead of God the creator of all ; thus the attributes, came in time to be worshipped as separate divinities ; the priesthood had an interest in multiplying the number of gods, and the system was convenient for the poets, and as they have been the most delightful recorders of the mythology, they have been held to be the inventors.

Q. In what particulars do the Asiatic and the Grecian mythology agree ?

A. Their system exactly corresponds with that of Hesiod, who in his book on the origin of the Gods, describes CHAOS as preceding CREATION ; that the elements of Chaos being separated, the universe arose into being and form. Thus fire, air, light, earth, and water, assumed the order adapted to their nature.

..... The omnific word bad "discord end"  
 And Chaos heard his voice : and in his hand  
 He took the Golden compasses, prepared  
 To circumscribe the universe sublime,  
 One foot he center'd, and the other turn'd  
 Round the vast profundity obscure,  
 And said ...this be thy circumference, O world !  
 ..... Angelic harmonies resounded ;  
 The Heavens and all the constellations rung ;  
 The planets in their stations listening stood,  
 While the bright chorus ascended jubilant.

MILTON.

Ovid's metamorphoses contain the same theory as that of Hesiod ; which exactly correspond with the mythology of the Bramins ; the names only differing ; but the meaning of the terms agreeing.

Q. Give me a few examples ?

A. I will give you one which shews a further remarkable coincidence ; not only do the attributes of the Hindu and the Greek and the Roman mythology agree, but the days of their weeks are named as ours are, after gods whose attributes are the same.

ENGLISH.	LATIN.	SANSCRIT.	MEANING.
Sunday	Dies Solis	Oudeetee } Rebbee }	the Sun day.
Monday	Dies Lunæ	Some war	Moon day.
Tuesday	Dies Martis	Mungul war	Mars day.
Wednesday.	Dies Mercuri	Boodhee war	Mercury day.
Thursday	Dies Jovis	Bruspeeter war	Jupiter day.
Friday	Dies Veneris	Shookre war	Venus day.
Saturday	Dies Saturni	Sohenischer war	Saturn day.

Q. This is a remarkable correspondence.... does it extend throughout ?

A. Most minutely, and even to the signs of the zodiac, and the forms of the constellations ; and even to the four ages of the world,

## CLASS VIII...LESSON VII.

## OF MYTHOLOGY.

Q. GIVE me some account of the agreement between the Grecian and Hindu mythology, mentioned in the preceding lesson?

A. The mythology of the Greeks divides time into four ages, which were descriptive of the state of mankind at the several periods.

1. The Golden Age....or age of innocence and happiness.

2. The Silver Age....or age of degeneracy and vice.

3. The Brazen Age....when man became wicked.

4. The Iron Age....when man became wholly corrupt.

So the Hindus have their four ages ; which their fabulous mythology thus describes....

1. Suttée Jogue, or the age of purity....which lasted they say, 3,200,000 years....when the life of man was 100,000 years....and his stature 21 cubits high.

2. Tirtah Jogue....when men became half reprobate....this lasted 2,400,000 years....man's life 10,000.

3. Dwappaar Jogue....half mankind vicious....1,600,000 years....human life 1000 years.

4. Collee Jogue....the iron age, when all men were corrupt....duration 400,000....man's life 100 years. They say only 5507 years of this age is yet past, in 1811.

Q. There is a strong resemblance....but how came the attributes of the true God to be multiplied into separate divinities ?

*A.* It was very natural for men, before sciences were discovered, to worship by the impulse of feeling: some of our American Indians worship the sun and moon, as first causes; they consider thunder, snow, and rain, as coming from separate sources, and their feelings towards each, are mere sensations; the sun produces grateful feelings; and it becomes a god of beneficence; the moon is tranquil, and at night favors the huntsman....as Luna, she is the Goddess of hunters; thunder always excites astonishment; and sometimes destroys....it becomes either Jupiter or Mars; and thus every sensation arising from external causes, creates a new divinity. The winds blow with anger from the north....it is Boreas; the fields are covered with the harvest....it is the gift of Ceres; the trees are loaded with fruit....they are furnished by Pomona; the ardent heats of the summer are tempered by the western breeze....it is Zephyrus; the rivulets and rills murmur....they are the sighs of the Naiads; the flowers are sprinkled with dew....they are the tears of Aurora; and thus all creation is personified into countless deities, and the earth and waters, the air and infernal regions, have their several divinities.

*Q.* It was necessary to be informed of the origin of the mythology; please now to proceed with the particulars?

*A.* The Greeks divided their gods into six classes. 1, the celestial; 2, terrestrial; 3, marine; 4, infernal; 5, subordinate; 6, demigods.

*Q.* Where do we find them described?

*A.* According to Hesiod, who lived 907 years before Christ, in his book called the *Theogony*, or account of the Gods, man was formed out of

tempered clay, by Prometheus, the son of Japetus, who having stolen fire from heaven, animated the form he had made. Now the same Theogony says *Japetus* was the son of *Cælus* and *Terra*.

Q. Who were *Cælus* and *Terra* ?

A. Their names are literally *Heaven* and *Earth*....who, in the allegorical system of mythology, being created by the same parent, were brother and sister ; they are represented as having seven children, of whom one was *Saturn* ; thereby meaning the seven days of the week.

Q. Have *Cælus* and *Terra* any other attributes or names ?

A. *Cælus* is also called *Titan* ; and *Terra* is called the mother of the Gods, and was worshipped under the names and attributes of *Cybele*, *Rhea*, *Ops*, *Pales*, *Vesta*, and *Berycinthia*, she was said to be skilful in physic, because the earth produced herbs, and she presided over cultivation.

Q. What is the history of *Saturn* ?

A. He is the god of *Time*, it is to be supposed, because time commenced with creation ; he is represented as an old man, holding a snake with its tail in its mouth, a symbolical circle, significant of eternity, or that time has no end, and the tail being in the mouth, that time devours itself ; in his right hand he holds a scythe, significant that he mows down all things ; he is also represented as devouring his own children, the days and hours, that is time ; the Hindus have given him the last day of the week on that account. He is also represented as having married his sister *Ops*, by whom he had *Jupiter*, *Ceres*, *Juno*, *Pluto*, and *Neptune*.

Q. Was *Ops* a goddess ?



*A.* Yes....in Rome called Rhea, in Greece Ops. She is represented as a matron, holding forth her right hand to aid the helpless ; and in her left a loaf of bread : she had various other names and attributes, which will be noticed when we talk of Cybele.

Q. What is the history of Jupiter ?

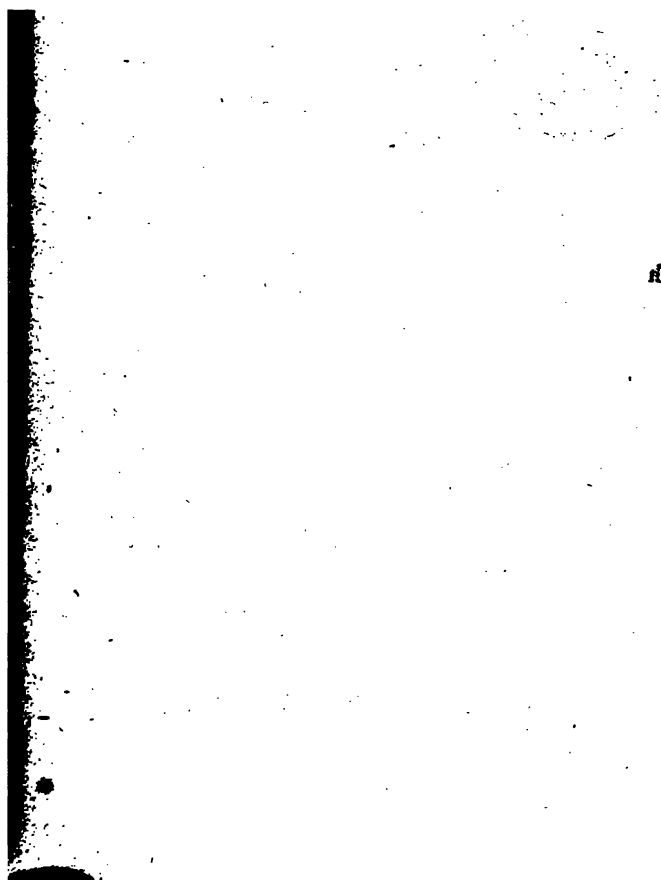
*A.* He is represented as the twin brother of Juno ; because Jupiter is the personification of thunder and the meteors which amaze mankind ; Juno represents the *air* ; hence Jupiter, or thunder, is called her husband. He is painted with a thunder-bolt in his hand, and beside him an eagle ; and she in a chariot drawn by peacocks. Jupiter, from his incomprehensible power, the ancients considered as the greatest of the gods ; he is said to have divided the world between himself and brothers ; his *sister-wife*, retaining her province, the air : Neptune had the sea, and Pluto the infernal regions ; reserving for himself heaven and earth. He had various names, in various countries ; in Greece he was called Jupiter Ammon, (which signifies sandy ;) in Babylon, Belus ; Osiris, in Egypt ; in Rome, Capitolinus, and Optimus Maximus ; among the Cretans and Campanians, *Diespiter* ; between which, and his Hindu name, *Brehespeeter*, there is an apparent resemblance. The wars of the Titans and of the Giants of fabulous history, are said to have been waged against Jupiter.... He is said to be the father of the Seasons, Irene and Eunomia ; of the Fates, Clotho, Lachesis, and Atropos ; of Apollo and Diana by Latona ; of Venus, by Dione ; of the Graces, Aglaia, Euphrosyne, and Thalia, by Eurinome ; of Prosperine, by Styx ; of the nine Muses by



JUPITER.



APOLLO.



Mnemosyne, &c. His statue by the Cretans, was without ears, significant of his candor : at Lacedemon he had four heads, which his statues this day bear among the Hindus. Minerva, or Wisdom, is said to have come armed from his forehead into the world.

Q. Who is Apollo?

A. He is the God of Physic, of Poetry, Music, Eloquence, and all the fine arts ; he was the Orus of the Egyptians, and the Audeetye of the Hindus. He is represented as the son of Latona of the country of the Hyperboreans ; and is called Sol, or the Sun, Phœbus, Hyperion, Pæan, Delphicus, from his temple at Delphi ; Mithra by the Persians and modern Parsees or worshippers of fire ; Nomius, from his giving laws to the Arcadians ; in heaven he was called Sol ; on earth, Liber Pater ; in hell, Apollo. He had temples at Delphi, Delos, Claros, &c. He is usually painted as a beardless young man, with flowing hair of golden color, and with a harp, a shield and arrows, significant of his attributes, harmony in heaven, protection on earth, and punishment in hell. The name of his mother Latona, is derived from the Greek (*lanthanō*, to be hid ; ) because before the birth of Apollō (the sun) and Diana (the moon) all things were hidden in darkness.

## CLASS VIII....LESSON IX.

## MYTHOLOGY.

Q. WHO is Neptune ?

A. The brother of Jupiter and Pluto ; he is described with a trident, and is drawn by marine animals in a chariot formed of a sea shell. The Greeks called him Poseidon, and the Hindus *Shuli* ; the chariot of the Indian Neptune is a leaf of the Lotus flower, which grows only in water. The power of Neptune extends over all waters, and at his presence the sea becomes calm and unruffled.

Q. What is the mythology of Pluto, the other brother of Jupiter ?

A. He presides over the infernal dominions ; the Greeks called him *Hades* ; the Hindus *Shradeva* ; his attributes are the same in those several nations. He presided over funerals, and the invention of funeral obsequies are attributed to him ; his name, (Pluto) is derived from the earth, from which all things spring, and to which they again return ; Hades likewise, means dark, gloomy ; and Shradeva is the god of sorrow and disconsolation and tears ; he is called *Oreus* because he follows in the rear of armies. The thunder which happens at night is attributed to him ; whence he is called the infernal or Stygian Jupiter.

Q. Who was Mars ?

A. The son of Juno, whom the mythologists say she conceived without Jupiter, in envy of his singly producing Minerva. His name is from *mavors*, warlike ; the Greeks called him



NEPTUNE.



PLUTO.









MARS.



VULCAN.

*Ares*, from the destruction of war ; the Hindus, *Kartiguna* and *Seanda*, or the leader of the celestial armies. He had a sister called *Bellona*, who is also called the goddess of war. He was represented on foot in armor ; and when in a chariot he was drawn by two horses called *Flight* and *Terror* ; *Discord* leads the way in front : *Clamor* and *Outrage* follow in the rear ; his chariot is driven by *Bellona*, who lashes the horses with a torch ; and he holds in either hand a javelin and a sword.

Q. What is the mythology of *Vulcan* ?

A. This god though reduced, by the freedom which men take even with the gods, to a secondary rank, was in the early stages of mythology a deity of the first order. He was the *Phita* of the Egyptians, which the Greeks expressed *Ephiasos*, and the Romans *Vulcan* ; he is the same as the Hindu god *Viswarcama*, who like the Greek God was reduced to the rank of a mere mechanical God. The true origin of *Vulcan* was the same as that of *Jupiter*, he represented fire or heat, one of the most active principles of nature, by which the world has been enriched with the works of genius and art. He erected the palace of the immortal Gods, and forged the weapon of *Jupiter*, the symbol of omnipotence ; he is represented as a deformed lame old man, occupied in a forge, with a long beard, a round blue cap or tonsure on his head. He is called also *Mulciber* ; he was the father of *Cupid* by *Venus*, of *Cacus*, and of *Cecrops*. His forge was supposed to be under *Mount Etna*, and the *Cyclops* his workmen ; he forged the shield of *Achilles*, the collar of *Hermione*, and the sceptre of *Agamemnon* ; to him is at-

tributed the manufacture of Pandora's Box. He was betrothed to Minerva, but she rejected him ; he was married to Venus.

Q. Give me some account of Venus and the rest of the family of love ?

A. Venus, Cupid, Hymen and the Graces.... Matter modified in its most beautiful form was called Venus ; the most exquisite emotions are excited by her presence ; she displays her cestus....she disarms the god of war, dissipates storms, and arrests even thunder ; at her appearance the earth becomes calm, and multitudes of beings yield to her influence and propagate their kind. Cupid or Love was held to be her son, though he accompanied her from her birth ; the Graces or Charities are her attendants....Aglaia, from her virtue and cheerfulness, Thalia from her perpetual bloom of youth, and Euphrosyne from her liberality and vivacity. Cupid is represented as a boy void of experience, naked because love has nothing of his own, blind because love cannot see faults. Hymen presides over marriage, is a young man crowned with sweet marjoram and roses, denoting that marriage should be early ; in one hand he carries a torch, indicating the purity of connubial love, and in the other a flame colored veil, representing the blushes of modesty. Cupid was called *Eros*, by the Greeks, and *Manmadin* by the Hindus, by whom Venus was called *Bhavani* and *Khamadeva*.





VENUS.



MERCURY.

## CLASS VIII....LESSON X.

## OF MYTHOLOGY.

Q. PROCEED with your account....Who is Mercury?

A. The history of this God shews how subtle is the allegorical mythology of the ancients ; his parents were Jupiter and Maia ; he is the messenger of the Gods, the patron of travellers, orators, merchants, and thieves ; his name is derived a *Mercibus* ; he is the *Hermes* of the Greeks ; the *Nared* and *Bhudda* of the Hindus, who attribute to him the invention of writing, arithmetic, geometry, astronomy. The allegorical divinity of Mercury is to be traced into his attributes, and are various. The use of speech must have preceded society. When letters were discovered, they must have excited great reverence for the inventor. The divisions of the ground among families gave rise to geometry, which being written was naturally attributed to the same author. The study of the stars had a similar reference. His attire the winged cap, or petasus, the wings or talari to his feet, indicate the rapidity of the mind, and that writing superseded oral communication at immense distances ; his caduceus is the symbol of astronomy, the rod represents the equator, the two serpents the oblique progress of the sun in the ecliptic. He was called *Thot* by the Egyptians, and on the pedestal of his statue was written the number 36,525, understood to refer to the Egyptian year which consisted originally of 360 days ; they attributed to Thot, or

Mercury, the addition of five intercalary days, and one-fourth of a day, as thus expressed decimally 365.25. He is also the God of the Chemists, as he detected the secret operations of nature?

Q. Who is Bacchus?

A. He is called the son of Jupiter by Semele, daughter of Cadmus; the story is perplexed and obscured by contradictory accounts given of him. He is the Osiris of the Egyptians, and the *Sri Rhama*, and *Bhagvat* of the Hindus. While Ceres taught the cultivation of grain, Bacchus taught that of the vine; he fostered the manners of a rude people, which is signified by the lions and tigers which he has tamed to draw his chariot. Bacchus is said to have been torn to pieces, which only represents the art of the vintage; he is crowned with grapes, and is attended by noisy worshippers, to indicate the joys of the season and the riches of the harvest; old Silenus follows in his train intoxicated, the same Silenus who was reckoned in the number of the wise men; who awakened from the intoxication of ignorance, chaunted in sublime strains the formation of the world. This account corresponds with the Hindu *Bacchus* or *Bhagvat*. He is by the Romans and moderns made the deity of drunkards, and is drawn as a man with two faces, one old and the other young, because wine taken in excess brings on decrepitude, taken in moderation invigorates and preserves the health.

..... The jolly god comes in,  
His hair with ivy twind, his clothes a tiger's skin,  
Whose golden claws are clutched into a knot



**BACCHUS.**



**JUNO.**





Q. Who was Cybele?

A. She is the reputed mother of the gods and men, and is called *Terra* or the earth; because in the order of creation, the earth first appeared. She is represented as a majestic woman, her head crowned with towers; in her hand a key, either because the earth contains treasure, or because winter locks up vegetation, which it is one of her attributes to promote; she rides in a chariot, symbolical of the earth, suspended in the atmosphere, and is drawn by lions, because there is nothing, however savage and ungovernable, but motherly tenderness may tame. The towers of her head represent cities, of which she is the goddess. She was called *Ops* when invoked by the husbandmen; and *Uranus* as being suspended in the middle of the universe; and as the mother of the constellations. She was also called *Vesta*; and had temples, in which a pure flame was constantly kept burning. Only the pure and the virtuous were allowed to approach her. The virgins who guarded the sacred fire, were put to death if they suffered it to expire. A similar institution was found in Peru upon its discovery; the Virgins of the Sun suffered death, if defiled. The Hindu goddess *Gaburra*, is also crowned with towers, and has the same attributes.

Q. Let your account of the remainder be more brief, as those we have considered shew the allegorical character of the ancient mythology.

A. Juno, as before mentioned, was the sister of Jupiter, or the elementary *air*; which is also the Hindu goddess *Paravati*. Her attendant or messenger, is *Iris*, or the rainbow.

Ceres is the goddess of agriculture and civilization ; her head is wreathed with a coronet of wheat in the straw ; her Hindu name is Latchemi ; and her attributes are the same.

CERES was she who first the furrows plough'd ;  
Who gave sweet fruits, and easy fruits allow'd ;  
Ceres first tamed us, with her gentle laws ;  
From her kind hand, the world subsistence draws.

Diana, called also Luna, or the moon, also Hecate, Lucina, and Opis, she is the goddess of pregnancy ; by the Egyptians she was called Bubastis ; by the Hindus, *Calli* ; and is represented with a crescent on her forehead.

Minerva, or Pallas, the daughter of Jupiter, called by the Greeks, Athene ; by the Hindus, *Durga* ; by the people of Samos, *Eagatis*. Born from the forehead of Jupiter, she is the goddess of wisdom, and an owl attends her as an emblem of gravity.

Janus was the god of gates and doors, had two faces, whence he was called Bifrons and Biceps, and had a temple at Rome, which was closed whenever the Romans made peace.

JANUS himself before the fane shall wait,  
And keep the dreadful issues of the gate  
With bolts and iron bars. Within remains  
Imprisoned fury, bound in brazen chains ;  
High on a trophy, rais'd of useless arms  
He sits, and threats the world vain alarms.

The Muses, daughters of Jupiter Mnemosyne, or Memory ; they are Calliope, the muse of rhetoric and epic poetry ; Clio, of History ; Erato, of Romance ; Thalia, of Comedy ; Melpomene, of Tragedy ; Terpsichore, of Dancing ; Polyhymnia, of Lyric poetry ; Euterpe, of Mu-



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sic and Logic ; Urania, of Astronomy. Their residence is Parnassus, where Apollo presides over them. The Hindu muses are called Gopya, and have each their separate attribute, and their Parnassus, which is called Goverdhan ; Apollo is called Christna, and Agni, which means fire, emblematic of the sun, or Apollo.

Q. Who are called the Demigods ?

A. Men who performed some celebrated action, among whom was Perseus, the son of Jupiter and Danae, husband of Andromeda, whom he delivered from a sea-monster : his principal action was his victory over the Gorgons ; one of whom, Medusa, he slew.

Hercules, the son of Jupiter and Alcmena, husband of Amphytrion, and is the most celebrated of all the Heroes or Demigods : famous for his twelve labors.

Orpheus, who charmed all hell with his lyre, and obtained from Pluto permission for his wife Eurydice to return to the earth.

Castor and Pollux, twin sons of Jupiter and Leda, and brothers of the beautiful Helen. Castor having been killed, Pollux was permitted to partake of his immortality ; so that they lived and died, alternately six months.

Jason, the chief of the Argonauts, celebrated for his conquest of the golden fleece at Colchis : He was enabled to effect it by the aid of Medea, who became his wife.

Theseus, famous, in particular, for his destruction of the Minotaur. He effected it by the assistance of Ariadna, who rescued him from the Labyrinth by means of a clue of thread.

Q. These are not all the Gods of the Mythology ?



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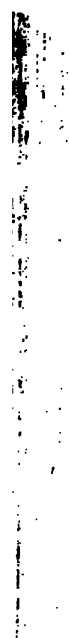
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Q. These are not all the Gods of the Mythology ?

*A.* By no means....they exceed all number.... but their nature can be understood by this abstract. These further illustrations will be sufficient.

The ancients, like our Indians, had but simple notions of their being....the eastern colonies from Asia, introduced to the Palasgic the Asiatic theogony: religion became the depository of the arts and civilization: God, nature, and man, are the great objects; and hence three degrees or kinds of theology, which may be called the intellectual, the physical, and the civic; the first of sciences is the developement of the nature of things, which elevates the mind to the contemplation of their origin. The objects themselves, demand a second place; the unalterable laws of existence and mortality, of the seasons, of day and night. Next man himself, his relations as a social being, his labors, his discoveries, all come to be objects of gratitude and admiration. Adoration is but a gratitude more sublime; and this is the foundation of the ancient mythology.

The Phenicians brought mythology from Asia to Greece along with their merchandize, whence it spread over Europe, along with the spirit of despotism congenial to the institutions of Asia. But the mythology of Asia was made to bend in Greece and Rome, and to admit a multitude of new divinities....but though the divinities often changed places, and many assumed new names, and new divinities were created out of the division of their attributes, and even from the passions of men, still the order of the classes remained.

The first class represented the active or creative principles of the true God...and these were Vulcan, Minerva, Vesta, Hecate, Nemesis ; then there belonged to this class those which represented the passive principles, Rhea, Latona, Love, Venus ; and again the union of the two Proteus and Pan.

The second class, or of the visible creation, were Cybele, Ops, Uranus, Saturn ; the signs of the Zodiac, the sun under various qualifications, as Jupiter, Vulcan, Pluto, Neptune, Apollo, Esculapius, and Priapus ; and the Moon represented by Io, Iris, Argus, Juno, Diana, Lucina ; to these were added Mercury, the Muses, the Fates, &c.

The third class or mortals, Prometheus, Pandora, Tantalus, Ceres, Proserpine, Bacchus, Hermes ; the allegorical class, as Demons, Cyclops, and Penates, and Apotheosis.

Q. Was there not another classification of the Gods ?

A. Yes....they were divided into four orders :

1. The supreme Gods, or Gods of nations of whom Jupiter was the chief ; they were 20, and divided into two classes, of which six Gods and Goddesses formed the cabinet of Jupiter. Jupiter, Neptune, Mercury, Apollo, Mars, Vulcan.... Juno, Ceres, Minerva, Vesta, Diana, Venus.... The other 8 were select Gods....Coelus, Saturn, Genius, Orcus, Bacchus, Sol, Terra, and Luna. Those who were not of these classes were called *Indigetes*, acting as Gods ; or *Lemones*, or half men.

The Grecian and Roman mythology is very much disfigured by licentiousness : and the occurrence of supposed connexions and acts of

their gods, under the allegorical form, which are very pernicious and immoral when unexplained.

Q. What were the labors of Hercules?

A. They are exploits of a very extravagant kind, and have been limited to twelve.

1. He strangled the lion of Nemea, and wore the hide. The scene of action was Argolis.

2. The Hydra of Lerna, in Argolis, from which the heads as frequently as they were cut off, sprung out again in great numbers.

3. The wild boar of Mount Ergmanthus, in Arcadia, which he took alive and conveyed on his shoulders to Eurystheus.

4. The Hind with brazen feet, which he took in the chase on Mount Menale.

5. The terrible birds of lake Stymphalis which were carnivorous. Hercules exterminated them by showers of arrows. This action was in Arcadia.

6. The Bull of the island Crete, which he conveyed alive into Peloponnesus.

7. The Mares of Diomedes, which fed on human flesh, and which Hercules carried off... This action was in Thrace.

8. The girdle of Hipolite, queen of the Amazons, which he secured after having defeated her.

9. The stables of Augias, which he cleansed by changing the course of the river Alpheus, in Elis.

10. The monster Gerion, king of Gades, whom he killed and carried off his flocks.

11. The golden apples of the Hesperides, which he carried off after having killed the dragon.

12. He delivered Theseus from Hell and carried off the terrible three-headed dog C'erberus in chains.

AN EPITOME  
OF THE  
ARTS AND SCIENCES.

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## CLASS IX....LESSON I.

## NATURAL PHILOSOPHY.

Q. WHAT is to be understood by natural philosophy?

A. In its simplest sense, it means the love or pursuit of wisdom; in a more comprehensive sense, it means the science of the study and investigation of nature, or of the powers and properties of natural bodies, and their action upon each other. It has been classed under three different branches, each of which is again classed into several distinct sciences.

Q. What are the three first classes?

A. The first is what is denominated *physics*, or the study and knowledge of all visible and sensible subjects, which is called experimental philosophy. 2. *Metaphysics*, which treats of subjects dependant on the mind or intellect, as the reasoning faculty. 3. *Moral Philosophy*, or what regards the conduct of human life, government, laws, liberty.

Q. Are these the only divisions of natural philosophy?

A. There are numerous others, as some divide it into two classes only; as *practical*, and *speculative*; the first of which is again divided into



logic and ethics ; and the latter into demonstrative and hypothetical. It is, however, rather an aggregate of several branches, or a term signifying numerous sciences, than a regular science itself ; the scientific character being dependant on the due order and perfections of the science which it comprehends.

Q. What are the sciences principally comprehended in Natural Philosophy ?

A. They may be thus arranged. 1. Things that relate to the heavens. 2. To the air. 3. The waters. 4. The earth.

Under the first head is Cosmography, Astronomy, and those sciences which are used to demonstrate them ; as Mathematics, Geometry, and Optics, Mechanics, Gravitation.

Second head ; the Atmosphere, Pneumatics, or the properties of Air, Meteorology, the Winds, Electricity.

Third head ; the Sea, Tides, Mineral waters, and Marine productions.

Fourth head ; Geography, Geology, Mineralogy, Botany, and human and other animated beings.

Q. But some of these refer to Moral Philosophy ?

A. That branch belongs to man alone, and concerns his conduct and happiness, and is embraced under commerce, politics, and ethics.

Q. What are the great principles of Natural Philosophy ?

A. The celebrated Bacon, Des Cartes, and Newton, established certain laws, by which the investigations of Natural Philosophy are governed : Newton, the great master of science, has given them this form.

1. More causes for natural things are not to be admitted, than are true and sufficient; for nature does nothing in vain; she delights in simplicity, and never in superfluity. Therefore,

2. Natural effects of the same kind, are to be assigned to natural causes.

3. The properties and qualities of natural bodies cannot be encreased or diminished; thus all bodies have extension, divisibility, hardness, impenetrability, mobility, resistance, and gravity.

4. In Experimental Philosophy, propositions founded on phenomena by induction, are to be deemed either exactly or nearly true, until experiment, or other phenomena, prove the contrary; otherwise, induction might be destroyed by hypothesis.

Q. But how are these laws to be executed?

A. By conducting all reasonings in the manner of Mathematics, or Anatomy, or Chemistry, or natural history generally; by analysing instead of assuming; by examining particularly, instead of forming a judgment upon a general view..... This analysis consists in making experiments and observations, and drawing conclusions from them by analogy, and admitting no objections against conclusions, but what are taken from experiments or certain known truths.

## CLASS IX....LESSON II.

## OF ASTRONOMY.

Q. WHAT is astronomy ?

A. The science by which we are taught the motions, magnitudes, distances, order, and revolutions of the heavenly bodies.

Q. What do you particularly understand by the heavenly bodies ?

A. The sun, the planets, stars and comets.

Q. What do you mean by the motions of the heavenly bodies ?

A. The planets are known to revolve in various orbits, according to certain principles which have been accounted for by philosophers.

Q. What is meant by magnitudes ?

A. The size or bulk of the planetary bodies in relation to each other, and to some known measure.

Q. How do you explain this relative or known measure ?

A. By taking some familiar standard, such as a foot measure of twelve inches ; we have a perfect idea not simply of its length, but of a quarter of its length, an inch or one twelfth part of its length ; we have also in our power to form accurate ideas of double its length, and of any other number : we then have another measure called a *mile*, which consists of 1760 of these feet, and by this measure of a mile we act in measuring large spaces, as in the case of a foot in small ; and there are other standards for the measure of larger spaces and bodies....such as leagues, which consist of a certain number of

miles, and degrees which consist of a greater number of miles still ; it is by these standards we compute distances and magnitudes.

Q. How do you use them in the science of astronomy ?

A. A knowledge of the mathematics is necessary to comprehend the practical method of measurement ; but learned men have already determined certain principles by which we may understand the subject ; for example the diameter of our globe is known to be about 7964 miles, its circumference 25,020. We know that of all the heavenly bodies the nearest to our earth is the moon, and that its mean distance from the earth is 240,000 miles ; we have a shorter method of comprehending the distance, by computing the proportions by the diameter of the earth ; and we find that the moon's distance is about 30 diameters of our earth : again we may judge of the distance of the sun by the same rule, its mean distance is 95,000,000, or 300 times farther off than the moon : but when we say 9000 diameters of the earth, we render the idea more simple. We judge of the magnitudes and distances of all the planets in the same way ; the nearest of the fixed stars is 5000 times more distant from us than the sun, or 45,000,000 of times the earth's diameter.

Q. What is the sun ?

A. That glorious luminary created by God as the source of light and heat to the world ; which is the centre of our planetary system.

Q. Is the nature of the sun known ?

A. No ; some imagine it to be a mass of fire, continually supplied with globules of combustible matter, and therefore have thought it to be

the place of hell ; others consider it as an elementary fire, which subsists without any kind of extraneous nourishment.

Q. What is understood of the size or magnitude of the sun ?

A. It is the largest of all known bodies, and by mathematical calculation is stated to be 793,000 miles diameter ; its size compared with the earth is as 1,392,500 to one ; and it is 539 times larger than all the planets put together.

Q. Why does it appear so small ?

A. On account of the distance, which is so very great, that a cannon ball would be little less than thirty years coming from thence to the earth, even if it flew as swift as a bullet does when it is first discharged from the mouth of a cannon.

Q. Is the sun fixed or moveable ?

A. It was formerly supposed that the sun moved round the earth, because it seemed to do so : but it is now demonstrated that the earth moves round about the sun.

Q. Has the sun no motion of its own ?

A. Yes....certain spots are seen on the face of the sun, which move in an uniform direction, disappear and appear again, from which it has been found that it revolves on its own axis in 25 days. This axis is inclined to the ecliptic in an angle of about 82 degrees 30 minutes.

Q. Does the sun afford us any other benefit but that of light ?

A. Yes ; it ripens the fruits of the earth by its heat.

Q. Why is not the sun always visible after it rises ?

*A.* A thick cloud will sometimes conceal it from our view, by interrupting its rays. Of this we may be easily convinced :—if we stand upon the top of a high mountain above the clouds, the sun will then be visible, but totally hid from those in the valley below.

Q. What is the moon ?

*A.* A large globe, like our earth, in matter and form, which to our limited conceptions is formed only to give us light by night ; but many wise men believe the moon to be a world inhabited as ours is.

Q. Is the moon a luminary like the sun ?

*A.* No ; it is a dark opaque body, and receives all its light from the sun, and the light we see on the moon is only the sun's light shining thereon.

Q. How do we call the different degrees of light which the moon shews ?

*A.* Her phases. At NEW moon she is between the sun and the earth, and her enlightened parts are hid or turned from us ; when FULL, we are between her and the sun, and we see all her enlightened side :—she likewise appears as HALF a circle ; when about twenty days old she appears gibbous, then a little part of her light turns towards us.

## CLASS IX....LESSON III.

## ASTRONOMY.

Q. Having in our first class, treated of cosmography or the great system of the universe, let us now follow the rule of natural philosophy, by treating of particulars. What is to be particularly understood by astronomy ?

A. It is the science that treats of the heavenly bodies, the planets, stars, comets, and other phenomena of the heavens.

Q. Is the science very old or is it much improved ?

A. The records of the Hindus carry astronomical knowledge back to about 12,000 years, and the accuracy of their knowledge on the solar system is unquestionable long before either the Grecian or Roman name was heard of ; the science has nevertheless been wonderfully improved within the two last centuries, and particularly within the last 50 years.

Q. Who after the Hindus, are the most ancient astronomers known ?

A. Callisthenes, a disciple of Aristotle, is said to have collected the astronomical calculations of 1903 years before his time at Babylon ; but the Chaldean astronomy does not furnish any thing positive until 737 years before Christ. Hyparchus of Nicea, who died 125 years before Christ, formed a very good method ; Ptolomy of Alexandria, 280 years after, determined the longitude and latitude of 1022 fixed stars ; but he made the earth the centre of the universe ; and this prevailed till the 16th century, or in 1530, when the system that yet prevails, as computed by Kepler, Gallileo, and Newton, was established.

Q. What is a planet ?

A. A star that has a periodical and regular motion.

Q. In what manner do these planets move ?

A. They all, in different periods of time, perform their motion round the sun from west to east, in orbits more or less elliptical.

Q. How many planets are there ?

A. Our solar system consists of 30 known planetary bodies.

Q. How does that appear—when the common opinion is that there are only seven planets ?

A. The planets have been designated into primary, or of the first order ; and secondary, or those which were connected with the primary planets.

Q. Have they been always known ?

A. No ; there have been several new planets discovered within a few years.

Q. Are the planets all of the same shape ?

A. No....the sun is a perfect globe ; as is the moon ; the earth is not quite round, it being flat at the poles, like some apples at the stalk and flowering ends, or oblate spheroid ; Mercury, on the other hand, is an oblique spheroid ; Jupiter is surrounded by 3 belts and 4 moons ; Saturn, 2 belts and 7 moons ; Herschel 6 moons.

Q. Will it not be useful to state the names, and other particulars, of the planets ?

Q. They are as follow :



## PLANETS.

PLANETS.	Annual revolution round the Sun.	Diurnal rotation on its axis.	Diameter in miles.	Miles from the Sun.	Hourly motion.	Surface in square miles.
SUN.						
MERCURY.	83 days 23h. 16m.	25 days 14h. 8m.	813,246			1,828,911,000,000
VENUS.	224 16 49	Unknown.	3,224	37,000,000	95,000	21,286,000
EARTH.	365 6 9	23 hours 21m.	7,867	69,000,000	69,000	691,361,000
MOON.	365 6 9	24 hours.	7,964	95,000,000	58,000	199,859,860
MARS.	686 23 30½	29d. 17h. 44m.	2,180	95,000,000	2,200	14,898,750
JUPITER.	4332 14 27	24 hours 40m.	4,189	145,000,000	47,000	62,038,240
SATURN.	10759 1 51	9 hours 55m.	89,170	495,000,000	25,000	20,603,970,000
HERSCHEL.	30737 18	10 hours 16m.	79,042	908,000,000	18,000	14,102,562,000
CERES.	Unknown.	Unknown.	35,112	1,800,000,000	37,000	3,803,800,000
PALLAS.	1703 16 48	Unknown.	160			
JUNO.	2012	Unknown.	80			
VESTA.	Unknown.	Unknown.	Unknown			
			Unknown			

## CLASS IX...LESSON III.

## OF ASTRONOMY.

Q. IN the preceding lesson you mentioned thirty planetary bodies ; but in the table you name only twelve, beside the moon : what are the remaining ?

A. Among these the sun is not usually called a planet, it being the supposed centre of the whole system. But the moon also is only a *secondary* planet, its revolutions being performed round the earth, and at the same time accompanying the earth round the sun ; but I include the sun, in the number of the primary planets.

Q. This accounts for only one of the secondary planets....what are the rest ?

A. The planet Jupiter has four satellites, or moons, like that which accompanies our earth ; Saturn has seven, and Herschell six ; which make, with the twelve primary planets, thirty.

Q. Which are the new planets ?

A. The planet Herschell was discovered in 1782, by a German, whose name the planet properly bears ; the six satellites or moons of that planet were discovered afterwards ; they appear to move in a contrary direction from other satellites.

Q. Are there no more than two new planets ?

A. Yes....Mr. Piazzi, an Italian, discovered Ceres on the first day of the present century, January 1801 ; and Dr. Olbers, a German, discovered Pallas in 1802 ; Mr. Harding discovered Juno in 1804 ; and Mr. Piazzi Vesta, in 1807.... These astronomers gave the names to the planets they discovered.

Q. How may the planets be known ?

A. Mercury may sometimes be seen by the naked eye, but not frequently, on account of its nearness to the sun, in the splendor of whose beams it is hidden. The best way of observing it is in its passage over the sun, when it appears like a black spot on its surface. Venus is sometimes our evening, and sometimes our morning star. Mars may be easily known by its deep red color ; Saturn by its dusky paleness ; and Jupiter is distinguished from the fixed stars by the largeness of its size, and the steady brown brightness of its color, which is so great, that it will sometimes illuminate a thin cloud in the same manner as the moon. Herschell, Pallas, Ceres, Juno, and Vesta, are not to be seen without a telescope.

Q. Have all the planets moons attendant upon them like our earth ?

A. None but those we have mentioned, and these were unknown to the ancients before telescopes were invented, and cannot now be seen without that instrument : such of the planets as are farthest from the sun, and therefore enjoy least of his light, have that deficiency made up by several moons which constantly accompany and revolve about them, as our moon revolves about our earth.

Q. What is the earth ?

A. The earth is the globe we inhabit.

Q. How large is it ?

A. Its circumference is about twenty-five thousand miles.

Q. What is its true figure ?

A. Though we often call it a globe, yet it is by no means perfectly round, but widened out

at the equator, and flattened at both poles like a turnip ; or in the language of the science, its figure is an oblate spheroid.

Q. You mentioned that the moon moved round the sun with the earth ; how is the motion of the earth performed ?

A. The earth has two motions ; it turns round on its own axis every twenty-four hours, which alternately causes day and night, as either side is turned toward or from the sun ; it likewise revolves round the sun in three hundred and sixty five days, six hours, which periodical revolution produces the four seasons of the year.... This double motion of the earth may be compared to that of a coach drawn round a ring....the wheels go round on their own axis, at the same time that they move round the ring. It travels at the rate of fifty-eight thousand miles every hour ; which is one hundred and twenty times swifter than a cannon ball ; and by its rapid motion on its axis, the inhabitants of Philadelphia are carried five hundred and eighty five miles every hour. Those at the equator move much faster ; those towards the poles much slower ; and those at the very poles, hardly at all.

Q. What is the reason that some parts of the moon's face looks dusky, and others light ?

A. The bright parts of the moon's body are supposed to be the highest parts of land, which reflect the light of the sun, as hills, mountains, promontories, islands, &c. the dark parts of the moon are caverns, deep valleys, and places which reflect not the sun's light so strongly as others ; or the bright parts may be land, and the dark water.

Q. Is the moon larger than the earth ?

**A.** No ; the earth is at least fifty times larger than the moon.

**Q.** What is its distance from the earth ?

**A.** It is supposed to be about two hundred and forty thousand miles.

**Q.** What influence has the moon ?

**A.** It is said to be the cause of the tides.

**Q.** How happens that ?

**A.** By attracting the waters of the sea, it raises them higher.

**Q.** What else is observable of the moon ?

**A.** That it is believed to be inhabited : for to what end else can serve the distribution of land and water, mountains and vallies, but, as on our earth, to nourish and sustain men, beasts, and vegetables.

#### OF FIXED STARS.

**Q.** What are the other luminaries in the heavens called ?

**A.** They are called *fixed* stars, and *planets*, or moving stars.

**Q.** Why are the stars so distinguished ?

**A.** They are called fixed stars, because they do not appear to change their places.

**Q.** What are the fixed stars supposed to be ?

**A.** They are supposed to be so many suns, like ours ; having planets, or habitable worlds, moving round them ; and are supposed to be each the sun of remote systems resembling ours.

**Q.** What is their number ?

**A.** They are supposed to be innumerable. The number to be seen at once by the naked eye is not more than four thousand, nor have any more been discovered by the help of glasses than

about 60,000. The reason of their appearing so much more numerous is owing to their strong sparkling, and our looking at them in a confused manner.

Q. How have they been counted?

A. Several philosophers have devised means for counting them ; and have constructed tables of their places in the heavens, so that astronomers may know when any new star appears, or an old star disappears ; which has happened ; and by which accuracy some new planets have been lately discovered.

Q. Have not some modern discoveries been made of vast numbers of stars ?

A. Yes ; Herschell has shewn that what is called the milky way in the heavens, is but a greater collection of stars, whose light is visible though their bodies are too remote to be seen individually by the naked eye.

Q. Are there no stars that move beside the planets ?

A. There are many stars which, though they preserve the same place in the Heavens, are sometimes extremely bright, and at others so dark as to be scarcely visible ; several stars have disappeared from their former places ; and some new stars appeared in places where there were none before.

Q. What is their supposed relative distance ?

A. The nearest is computed to be 32 millions of miles from us, or farther than a cannon ball would reach in 7 millions of years. The orbit in which the earth moves is 162 millions of miles diameter, yet the size or distance of the fixed stars never appear increased or diminished.

Q. Are there any means by which you can convey an idea to the senses of their size in relation to each other, and their distance?

A. A globe of 24 inches diameter being taken as a representative of the sun, the proportion will be about the following:

	<i>Size.</i>	<i>Distance in yards.</i>
The sun,	- 24 inches,	
Jupiter,	- 2 5 tenths,	- 430
Saturn,	- 1 9 tenths,	- 788
Herschell,	- 1 1 tenth,	- 1570
Earth,	- 1 fourth of an inch	82
Venus,	- 1 fifth	- 60
Mars,	- 1 sixth	- 126
Mercury,	- 1 eighth	- 32

By the same proportion the distance of the ball representing the moon, would be 772 inches from that representing the earth.

Q. Can you form an idea of the distance of the sun by motion?

A. Suppose a cannon ball projected from a cannon, were to continue at the rate of 480 miles in an hour, if fired from either of the planets, it would require the following times to reach the sun from each.

From Mercury	- 8 years	290 days.
Venus	- 16	59
Earth	- 22	11
Mars	- 34	82
Jupiter	- 116	166
Saturn	- 213	330
Herschell,	- 427	290

## CLASS IX...LESSON IV.

## OF COMETS.

Q. Are there no other bodies which move in the heavens, but the primary and secondary planets ?

A. Yes....there are comets.

Q. What are comets ?

A. Comets are luminous bodies resembling stars ; they exhibit various appearances. Some of them appear simply like stars in color and brilliancy ; others with a long transparent tail, issuing from that side which is turned from the sun ; others with a luminous atmosphere around them.

Q. Have they been long discovered ?

A. They have been familiar to all antiquity ; but they were not considered as bodies governed by fixed laws like the planets ; they were known to the ancient Chaldeans. Pythagoras, who died 497 years before Christ, was the first who considered them as planets of a particular order ; Aristotle, who lived 200 years afterwards, considered them as meteors, like what we call falling stars ; Seneca, who died in the 65th year of our era, held the same opinions as Pythagoras ; in one of his works, he thus foretells what has since come to pass....  
“The time will come, when the nature of comets and their magnitudes will be demonstrated, and the routes they take so different from the planets, explained.”

Q. Who among the moderns have discovered their nature ?

A. Tycho Brahe, a Swede, formed the system that is now received, after a diligent observation



## CLASS IX....LESSON V.

## OF AIR.

Q. WHAT are the properties of air?

A. It was formerly a received notion that all nature was composed of four elements, air, earth, fire and water; these ideas are now exploded, as they are all found to be compound substances; the air enters into the composition of all bodies, and exists in them under a solid form, in this state it is called *fixed air*; it is figuratively described as the cement of all other bodies.

Q. As the air is a compound body, are the substances of which it is composed known?

A. Yes, chemistry which has unfolded to human curiosity a vast creation before unknown, has determined that it is composed of 22 parts of oxygen gas, or pure air, a true element, and 78 parts of nitrogen or azote.

Q. What are these substances called oxygen and nitrogen?

A. The perfect knowledge of them is to be obtained only by considerable attention to chemistry, but in a brief way they may be thus described, oxygen supports flame and animal life, but oxygen alone would be too active for animal existence; the glorious author of nature has tempered it by the admixture of nitrogen, which appears to act upon it as water does upon sugar or salt; it dilutes it, so as to fit it for animal life; nitrogen is so congenial to vegetation as to be considered as the food of plants.

Q. What idea can you give of the effect of the weight of the air.

*A.* It so closely invests the earth with all the bodies therein, that its weight is supposed to be equal to 15 pounds weight upon every square inch.

#### THE WINDS.

Q. What is the wind ?

*A.* Nothing else but the air put violently into motion ; and this is occasioned chiefly by means of heat ; and by the revolutions of the earth.

Q. How does the heat operate ?

*A.* When any part of the air is heated by the sun, or otherwise, it will swell, and thereby affect the adjacent air ; and by various degrees of heat in different places, there will arise various motions of the air ; the air much heated, will ascend towards the upper part of the atmosphere, and the adjacent air will rush in to supply its place ; and therefore there will be a stream or current of air from all parts towards the place where the heat is ; hence we see the reason why the air rushes with such force into a glass-house, a tile kiln, or into close rooms where great fires are made ; and also why smoke is carried up a chimney, and why the air rushes in at the key-hole of a door or small chink, when there is a fire in the room.

Q. How are the winds described ?

*A.* Into four principal ones, the NORTH, SOUTH, EAST and WEST, which receive their names from the points whence they blow.

The winds in various parts of the earth are not of the same temperature, though blowing from the same point of the compass.

In the United States, and in many parts of Europe, the south wind is warm, as it blows from the torrid zone ; but at the Cape of Good Hope,

at St. Helena, and in the Indian archipelago, the south wind is cool and refreshing.

In England the east wind is dry because it comes across Asia ; with us it is wet because it crosses the Atlantic ; while with them the west wind is damp and with us dry from similar causes.

#### OF THE MONSOONS.

Q. What are the winds called monsoons ?

A. They are the winds which blow in the Indian, Pacific, and Atlantic oceans, for nearly one half of the year in one direction, and the remaining part in the opposite direction.

Q. Do you know what is the cause of their uniformity and change ?

A. I have never heard it accounted for in a satisfactory manner....perhaps it may arise from the rotation of the earth from west to east at the rate of 58,000 miles an hour, which must decompose the atmosphere or air, and carry it in a current.

Q. But then the monsoons should blow either in the same direction with the revolution of the earth, or the contrary....east or west....whereas they blow either south-east or north-west, or nearly so ?

A. The obliquity of the ecliptic....the extreme cold at the poles, and the heat at the equator, may combine to give the winds the direction immediately between the cardinal points.

Q. But that does not account for the half year's opposition of the monsoon to the course of the preceding half year ?

A. Very true ; but the course of the sun in the ecliptic, one half year in the southern and the other in the northern hemisphere, may ex-

plain this. Observe....what is here said about the monsoons is merely speculative....to exercise ingenuity and promote enquiry.

The velocity of the wind is at the rate of 50 or 60 miles an hour in a great storm ; that of a common brisk wind is about 15 miles an hour ; and some winds move not even one mile in that pace of time.

A person, therefore, on horseback, and even sometimes on foot, may be said to outstrip the wind ; for if he moves faster than the wind, which is very possible, he will have a wind in his face, though the motion of the air be really the contrary way.

The air in the form of clouds is often seen to move in two contrary currents, and this happens generally previous to thunder. The clouds in such a case are seen to move one way, while the weather-cock points another.

An experienced seaman has furnished the following account of the ceasing of the North East trade wind, the result of a careful examination of nearly 300 journals ; it ceases in January between the 6th and 5th degrees of north latitude : in February between the 5th and 3d ; in March and April, between the 5th and 2d ; in May between the 6th and 4th ; in June in the 10th degree ; in August and September between the 14th and 13th degrees, and during the months of October, November and December, they blow as far as the line.

## CLASS IX...LESSON VI.

## OF TIDES.

Q. Pray what is meant by the tides, or alternate flux and reflux of the sea ?

A. As rivers flow and swell, so also does the sea : like them it has its currents, that agitate its waters, and preserve them from putrefaction.— This great motion of the earth is called its tides. The waters of the ocean have been observed regularly from all antiquity to swell twice in about four and twenty hours, and as often to subside again.

In its influx the sea generally rises for six hours, when it remains, as it were, suspended, and in equilibrio, for about twelve minutes ; at that time it is called high water.

In its reflux the sea falls for six hours, when it remains, as it were, in a like manner, suspended, and in equilibrio, for about twelve minutes ; at that time it is called low water.

Q. What is the cause of these wonderful appearances ?

A. According to Newton, they are occasioned by the attraction of the moon ; for the waters immediately under the moon will be attracted up in a heap, whilst the waters on the opposite side of the earth, being but feebly attracted, will be very light : if they be very light, they also will rise, and all the neighboring waters flowing into that place, they will swell into a heap or mountain of waters, pointing to the opposite parts of the heavens. Thus does the moon, in once going round the earth in twenty-four hours, produce two tides or swells, and consequently as many ebbs.

Q. How do the tides run ?

A. They must flow from east to west ; for they must necessarily follow the moon's motion, which is from east to west.

This course of the tides, however, is sometimes interrupted by the continents and other large tracts of land. The tide, for instance, in the Indian ocean, being stopped by the eastern coast of Africa, must necessarily flow south, towards the Cape of Good Hope ; which having passed, it then runs northward, along the western coast of Africa, and that of Spain, Portugal, and France ; part enters the English channel, and there meets the tide from the German ocean, running a contrary way, and is necessarily stopped, which produces a very great swell of the water : the rest proceeds north, towards the pole.

As to the tides in rivers, they must always flow in a direction directly the reverse with their natural stream ; for the waters of the sea being higher, they must necessarily flow into them, and make their waters flow back, or regurgitate.

#### CLOUDS, MISTS, AND DEW.

Q. You mentioned clouds, how are they composed ?

A. Clouds are nothing else but a collection of misty vapours, suspended aloft in the air, and soaring on the wings of the wind in a state so condensed, as to appear like substantial bodies.

Q. Pray how high do you suppose the clouds to fly ?

A. From about a quarter of a mile to a mile. It is common for persons, by climbing very high mountains, to get above the clouds, and see them

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swim beneath them, and, as it were, brushing the side of the mountains they are on.

Q. Whence come the various figures and colors of the clouds?

A. The wonderful variety in the colors of the clouds, is owing to their particular situation with regard to the sun, and the different reflections of its light; the various figures of the clouds result from their loose and voluble texture, revolving into any form according to the different force of the winds.

Q. How are mists formed?

A. Mists are those collections of vapours produced by the heat, and which chiefly rise from fenny moist places, and become more visible as the light of the day decreaseth.

Q. From what is the dew produced?

A. From a quantity of particles of water extremely subtle, that float about in a calm and serene air in form of vapours; these, being condensed by the coldness of the night, lose by degrees their agitation; and many uniting together, fall in the evening in small invisible particles, like an extremely fine and delicate rain, which continues but a short time, and is seen in drops of water like pearls, upon leaves and herbs.

#### RAIN.

Q. What is rain?

A. Thick clouds condensed by the cold, which, by their own weight, fall towards the earth and are broken into small quantities, called drops of water.

If the cloud that melts is greatly rarified, and its particles in falling, meet an air moderately warm, these drops will be so small, that they will not compose rain but mists only.

Q. Are not those countries near the tropics subject to rain?

A. They are—and the rain is considered as being produced from a phenomenon called a water spout—or an absorption of water, from the sea, from lakes or rivers, into the clouds, whence it is discharged in torrents of rain.

#### OF HAIL AND SNOW.

Q. What is hail?

A. Hail is formed when the parts of the cloud, beginning to fall in large drops meet in their descent a very cold air, which freezes them, and form ice, which are very near the figure and size the drops of water would have been had they fallen.

Q. How is snow formed?

A. Snow is produced thus : in winter the regions of the air are intensely cold, and the clouds of moisture cold on every side, quickly pass from that state of condensation which might reduce them to rain, into that which reduces them to ice ; so that in winter, as soon as the clouds begin to change into very fine drops of water, each of these small particles freeze, and touching each other, form flakes of snow.

Q. Why are these flakes so light, and the snow so white?

A. The small intervals that the flakes leave between them, like so many pores, filled with a subtle air, are the cause of their lightness.

The snow is white, because the small particles of ice that compose those flakes being hard, solid, transparent, and in chrystals differently arranged, they reflect to us the light from all parts.

## THUNDER AND LIGHTNING.

Q. What is thunder ?

A. A noise heard in the air most frequently in the summer. Thunder is the most wonderful of all meteors.

Q. What is the cause of this meteor ?

A. Thunder is caused by the meeting of two clouds, one charged with electric matter, and the other without a sufficiency to keep up the equilibrium ; they meet....and in the fierceness of their motion, burst with a tremendous noise, which is preceded by a flash of lightning or fire.

The reason we do not hear the dreadful noise of the thunder, so soon as we see the lightning is, because the sound is longer arriving to our ears, than light to our sight.

Light moves almost instantaneously : sound moves no more than 1142 feet in a second. That light moves much faster than sound, any one may satisfy himself, by observing a gun discharged at a distance, for he will see the fire long before he hears the sound.

The continuation and repetition of the sound is caused by a kind of echo formed in the clouds, to which many hard bodies on the earth may contribute, which return those rollings or reverberations we hear after a great clap of thunder.

Q. I have heard talk of thunder-bolts and their strange effects, pray what are they ?

A. What is mis-called a thunder-bolt, is a solid and most rapid flame, which, with incredible swiftness, flies from the clouds to the earth, and passes through every thing opposed to its course. It sometimes kills men and animals, burns and overthrows large trees and buildings.

## CLASS IX...LESSON VII.

## EARTHQUAKES.

Q. What is an earthquake?

A. A sudden motion caused by the inflammation of some sulphurous and bituminous substances contained in the bowels of the earth not far from its surface.

Naturalists attribute them to both air and water, and that very truly.—To comprehend this more easily, it must be remarked, that the surface of the earth is like a shell, beneath which there are an infinite number of cavities and canals, sufficient to contain a considerable quantity of air, water, &c. which, attempting to rush out violently, cause those extraordinary tremblings of the earth.... Others, however, are of opinion, that earthquakes are not so much owing to the explosion of any sulphurous matter, or the expansion of any winds or vapours in the bowels of the earth, as to the electric matter rushing along the surface of it, and perhaps communicating with that within.

Dr. Stukely was the first who advanced this opinion, in support of which he urged many specious arguments. In the first place, he says, that in the earthquake which happened at London, on the 20th September, 1750, and which affected an extent of country 30 miles in diameter, had it arisen from a subterraneous explosion, it must have moved an inverted cone, or, which is the same thing, a solid body of earth in the shape of a sugar loaf turned upside down, whose base was 30 miles, and its axis or depth, 15 or 20 miles; an effect which, he affirms, no natural power could produce.

Nay, in the great earthquake which happened in Asia Minor, A. D. 17, which destroyed thirteen large cities, and which affected an extent of country 300 miles in diameter, had it proceeded from a subterraneous cause, it must have moved an inverted cone of solid earth 300 miles in diameter, and upwards of 900 in circumference, and about 200 in depth and axis; which Stukely says, all the gunpowder which has been made since the invention of it would not have been able to stir, much less any vapours, which could be supposed to be generated so far below the surface.

Add to this, that a ship sailing on the deepest ocean is affected by an earthquake in the same manner as if upon dry land. Those on board seem to feel as if they had struck upon a rock, or as if something had thumped against the bottom of the ship. But this could never be the case, did the earthquake arise from a subterraneous explosion at the bottom of the sea; for that, at the utmost, could only produce a gradual swell of the water, and not a sudden shock, like a stroke of electricity, as it now does.

#### VOICANOES.

Q. Are there not many subterraneous places in the earth from which issue torrents of smoke and flames, rivers of melted metals, and clouds of ashes and stones?

A. Yes; they are called *Volcanoes*; the most famous of which are those of mount *Etna* in Sicily, *Vesuvius* in Naples, and *Hecla* in Iceland.

In an eruption from the second of these, some centuries ago, the two cities *Pompeii* and *Hercu-*

laneum were buried by the ashes and lava, and lay concealed in that state for several ages, till they were lately discovered. Pliny the elder, too, the famous naturalist, perished on the occasion. Pliny the younger, author of the epistles that go by his name, has given us an account of this catastrophe in one of his letters, he being present at one of the eruptions, but he escaped by sea.... As a model of epistolary writing, and of the purest composition, every young person should read Melmoth's translation of Pliny's letters.

The bowels of these burning mountains contain sulphur, bitumen, and other inflammable matter, the effects of which are more dreadful than those of thunder or of gun powder, and they have in all ages astonished mankind, and desolated the earth.

There was a most dreadful eruption at Etna consisting of liquid fire and burning matter, in 1693; it destroyed 15 or 16 different towns, 18 estates, and more than 90,000 souls.

Within the last thirty years there has not been fewer than nine several eruptions of Mount Vesuvius, besides many preceding ones. That which happened on the 15th of June, 1794, was preceded by earthquakes, first opening in two places, from which issued columns of black smoke, mixed with liquid inflamed matter; and afterwards more mouths were opened. Explosions, louder than thunder, with sharp reports, as from the heaviest artillery, proceeded from all of them. The lava flowed about four miles in four hours; the greatest part of Torre del Greco, a mile from Portici, was thereby destroyed, or so much injured as to be uninhabitable.

Though 17,000 inhabitants were driven out of the town of Torre del Greco, not more than

fifteen lives were lost there. A promontory of 70 feet high in some places, and about a quarter of a mile broad, has been formed by the lava which ran over the greatest part of this town to the sea.

The lava covered and totally destroyed above 5,000 acres of rich vineyards and cultivated land; and the temporary damage done to the vineyards on the Somma side, and for many miles round, by the ashes, was immense. In some places they were not less than four feet deep.

Q. Have earthquakes been frequent?

A. Few years pass without an earthquake in some part of the world; we have accounts of them recorded in all ages, and in all countries there are vestiges of volcanic matter....that of 1783, in Calabria, which produced terrible effects there and in Sicily, is memorable....it had not entirely ceased for two years.

A remarkable volcano appeared in the ocean in 1810, within sight of St. Michaels, one of the Azores; and it continued with various intermissions eight months, spouting up in the air volumes of fire and smoke.

## CLASS IX...LESSON VIII.

## OF WATER SPOUTS.

Q. What account can you give of water spouts ?

A. Our venerated countryman, Dr. Franklin, among his other curious and useful discoveries, has explained this most satisfactorily. He accounts for them by the same natural causes as whirlwinds, which he attributes to the rarefaction of the air, and that they seem to be intended by the author of nature as one of the means to supply the earth with moisture after exhaustion by evaporation from the heat of the sun.

Q. How does this agree with facts ?

A. Perfectly ; for water spouts are very rarely seen but in warm latitudes.

Q. But they have been sometimes seen very far north ?

A. Yes ; there are a few instances recorded in the Philosophical transactions of London ; one of which took up the whole of the water in the channel of Topsham, in 1694 ; another which was seen in the Downs in 1701. They have been seen frequently in the Mediterranean, and one of those is described so particularly as to merit notice.

Northward of Cape Bona, on the Barbary coast, distant 10 leagues, the night having been very stormy, with thunder and lightning ; about nine in the morning, the clouds looked dismal, black, and overcharged with rain ; in the N. E. quarter appeared three water spouts ; that in the middle being the greatest seemed as large as the mast of a ship, and appeared to be only a



league and a half distant, so that its real bulk must have been at least three times that of the apparent size. The other two spouts did not appear to be more than half the size of that in the middle. All of them were dark as the cloud above them ; and all smooth without knot or irregularity, but all smaller at the lower end like a sword ; sometimes one of them would bend, and again become straight ; occasionally diminishing to the apparent size of a rope, and renewing its size ; occasionally disappearing and again becoming gross.

Q. Are there not many extraordinary things said of their effects ?

A. It is certainly true that near the tropics, particularly in Bengal, where those spouts are for several months visible almost daily ; that in heavy showers of rain vast quantities of small fish from half an inch to an inch and half long are poured down on the earth from the clouds, which are supposed to have been formed by these spouts.

Seamen assert that there are two kinds of spouts, one which is a rising of the water towards the clouds like a funnel ; and the other when the water descends. In the former instance, the water is carried up with a noise like the sound of a spinning top, from which the French call them *Trombs* : they move from place to place with the wind, and it is said that if a ship comes in their course it is destroyed. Seamen also say that they usually fire at them when they approach, and if they hit them the spout breaks with a great noise, and no mischief follows.

Q. What is the appearance of the Water Spout ?

*A.* Annexed are two drawings which give a very faithful picture of this phenomenon.

*Fig. I.* *aa* is a large body of sea water rising in the form of a spiral column into the air.

*bb* The sea agitated around the base of the column.

*cc* A watery cloud, or mist, elevated to a vast height.

*dd* The vortex in which it terminates.

*ee ff* The descending spout from the dark cloud above.

*gg* The cloud from whence the spout descends by the vertiginous motion of the air, in a whirl.

*Fig. II.* Exhibits a spout seen near the island of St. Helena, by which it appears that the neighborhood of land affects the form and course of action of the spout.

*Q.* Are these all of the same appearance?

*A.* The drawings give a very accurate idea of them generally; but some do not appear so beautiful; and many of them to the amount of twenty or thirty at a time are seen in the neighborhood of the equator.

#### OF THE IRIS, OR RAINBOW, AND HALOS.

*Q.* What is the Iris or Rainbow?

*A.* A beautiful arch in the heavens, ornamented with various colors, which is seen only when the spectator turns his back to the sun, and when it rains on the opposite side. Its colors are, beginning from the under part, violet, indigo, blue, green, yellow, orange, and red.... These are called the seven primary colors.

*Q.* What was the opinion of the ancients concerning this meteor?

*A.* Its beautiful colors struck antiquity with amazement. To the philosophers Pliny and Plutarch, it appeared as an object which we might admire, but could not explain. The priests always preferred the wood on which the rainbow had appeared to rest for their sacrifices; vainly supposing that this wood had a perfume peculiarly agreeable to their deities. Some philosophers of the obscure ages began to form more just conceptions concerning this meteor; but as they were ignorant of the true cause of the colors, they left the task unfinished for the incomparable Newton to complete.

Q. Please to explain how the rainbow is produced, and how it acquires its beautiful appearance?

*A.* It is made, according to his theory, by the rays of the sun being refracted by the drops of rain falling on mist, and thence reflected to the spectator's eye. The rays of the sun falling on the drops of rain, fall on the eye of the spectator, who must be between the sun and the rain in order to see the rainbow; the drops being successively higher than each other, the rays least refracted produce red, those most refracted produce violet, and the intermediate as in the above order.

Q. There are sometimes two rainbows at the same time, how are they accounted for?

*A.* The interior bow is produced by one reflection of the rays of the light, the exterior and fainter is produced by two reflections, and if you will attend to it you will find that their colors are in a contrary arrangement: an easy experiment proves the cause of the rainbow; provide a transparent glass globe, and fill it with pure

water, hang it in the sunshine and view it in such a position, as that the rays which come from the globe to the eye, may, with the sun's rays, include an angle of about 42 degrees, the spectator will see a *full red* color in that side of the globe opposite to the sun; and if the angle be made less by depressing the sun or raising the eye, the other colors will appear in succession.

All the colors of the rainbow may be produced by making the rays of the sun pass through a transparent prism of glass.

Q. You have said nothing of the rainbows that sometimes appear by night during moonlight;—what think you of them?

A. The *lunar* rainbow is formed exactly in the same manner, by the bright beams of the moon striking upon the bosom of a shower.

Q. How do you account for that lucid ring we see diffused round the moon, called a halo?

A. This appearance is also called the *corona*, or *crown*, from its encircling the sun, moon, or other planets; and they sometimes exhibit the prismatic colors, like the rainbow. As this mostly appears in a *misty* or *frosty* season, we may suppose it occasioned by the refraction of light on the moist or frozen particles of the air.

## CLASS IX...LESSON IX.

## OF ELECTRICITY.

Q. WHAT is electricity ?

A. The science of electricity is that by which the principles and causes of thunder and lightning are accounted for by mechanical experiment; and by which houses, ships, and other elevated objects, may be protected from the violence of lightning.

As a substance, or principle of nature, subtle and in general invisible, denominated the electric fluid, which appears to pervade all nature, and to enter largely into the elementary causes of vegetable and animal life.

Q. Whence is it derived ?

A. From *electrum*, which means amber, a substance the attractive power of which was observed 603 years before the Christian era.

Q. Is electricity then an ancient discovery ?

A. By no means ; mere mechanical electricity or the productions of sparks and attractions by machinery, was known about the beginning of the 17th century, and some publications made on the subject by Dr. William Gilbert ; about 1733, Mr. Grey and the abbe Nollet gave some account of experiments of theirs ; but the discovery and demonstration belong to America, and to the city of Philadelphia, of the identity of the electric fluid and lightning.

Q. Who was the author of this discovery ?

A. The venerated man, Benjamin Franklin, who by his sagacity and genius reduced the fact to proof by means simple and surprizing.

Q. At what period did Dr. Franklin make this discovery ?

A. The first accounts of his experiments published, are dated 28th March, 1747, at Philadelphia, from that period his experiments were continued for several years.

Q. What is its nature?

A. Electricity is of two kinds, *positive* and *negative*; the first is that state of a body when it contains more than the usual proportion distributed through other parts of the universe; the latter is when a body contains less than the due proportion; and both or either may be produced artificially, as well as naturally.

Q. How does it operate?

A. There are bodies which are called electrics, these are *non-conductors*, or have the power of stopping the communication between bodies, such as glass, amber, sealing wax, rosin; these are also called electrics, *per se*, or by themselves.

There are other substances called *non-electrics*, which though incapable of being excited, can in certain circumstances convey the electric power from one body to another; these also are called *conductors*, the most perfect of which are water, metals, charcoal. An electric machine being prepared, and a conductor being presented to it, the electric fluid will pass; but if a non-electric, such as glass or rosin, is interposed, none will pass.

Q. The subject is interesting; I wish to be more particularly acquainted with it.

A. The best explanation I can give is in the words of Dr. Franklin himself, which I find in his works, it was written in 1752, wherein he explains the grand experiment by which he drew lightning from the clouds. It is dated October

19, 1752, and appeared in the Gentleman's Magazine.

“ Make a small cross of two light slips of  
“ cedar, the arms so long as to reach to the four  
“ corners of a large silk handkerchief when ex-  
“ tended ; tie the corners of the handkerchief to  
“ the extremity of the cross ; so you have the  
“ body of a kite ; which being properly accom-  
“ modated with a tail, loop, and string, will rise  
“ in the air like those made of paper, but being  
“ of silk is fitter to bear the wet and wind of a  
“ thunder gust without tearing. To the top of  
“ the upright stick of the cross is to be fixed a  
“ very sharp pointed wire, rising a foot or more  
“ above the wood. To the end of the twine  
“ next the hand, is to be tied a silk ribbon, and  
“ where the silk and twine join a key may be  
“ fastened. This kite is to be raised when a  
“ thunder gust appears to be coming on, and  
“ the person who holds the string must stand  
“ within a door or window, or under some cover,  
“ so that the ribbon may not be wet : and care  
“ must be taken that the twine does not touch  
“ the frame of the door or window. As soon  
“ as any of the thunder clouds come over the  
“ kite, the pointed wire will draw the electric  
“ fire from them, and the kite with all the twine  
“ will be electrified, and the loose filaments of  
“ the twine will stand out every way, and be  
“ attracted by an approaching finger. And when  
“ the rain has wet the kite and twine, so that  
“ it can conduct the electric fire freely, you will  
“ find it stream out plentifully from the key on  
“ the approach of your knuckle. At this key  
“ the phial may be charged, and from electric  
“ fire thus obtained, ardent spirits may be

“ kindled, and all other electrical experiments  
“ be performed which are usually done by the  
“ help of a rubbed glass globe or tube, and  
“ thereby the sameness of the electric matter  
“ with that of lightning completely demon-  
“ strated. “ B. F.”

Q. But how is this applied to the protection of houses?

A. This Dr. Franklin had also the glory to invent. “ In September, 1752, he erected an iron rod to draw the lightning down into his house, in order to make some experiments, in which he succeeded; he discovered the two kinds of electricity, and that the force of thunder very often proceeds from the earth to the clouds, as well as from the clouds to the earth; that the cause of thunder and lightning is by the collision of two bodies, one positively and the other negatively charged....or with too much in one and too little in the other; that the effort to become equal causes the thunder; and the stream of lightning is the same as the electric spark; metal conductors therefore carry on the communication between the clouds and the earth, and prevent the consequences that otherwise would result.”

#### THE AURORA BOREALIS.

Q. What is the cause of the Aurora Borealis, or that shining light which is often seen by night in the heavens, and which the vulgar call northern lights or streamers?

A. Formerly it was believed to be the result of certain nitrous and sulphurous vapors, thinly spread through the atmosphere above the clouds, where they fermented, and taking fire, the explo-



sion of one portion kindled the next, and the flashes succeed one another till all the vapour is set on fire, the streams whereof seem to converge towards the zenith of the spectator, or that point of the heavens which is immediately over his head.

Q. Whence is its name derived ?

A. Its name implies the northern light, because it was first noticed, and for some time supposed to be peculiar to the northern hemisphere ; but it has been since discovered in the southern hemisphere also, and there it is called *Aurora Australis*. It usually appears in the winter, and during frosty weather. It exhibits a roseate or *Aurora* reddish color, with corruscations that give a tinge of yellow and of purple ; the vibrations are present and visible by the pale light which they throw forth like the pulmonary throbs of the phosphor or fire fly ; they appear to rise from the earth in undulations or waves, and move with velocity to the zenith ; and a sound is often heard like the rustling of silk garments.

Q. When was this meteor first seen ?

A. It is believed by many judicious writers, that the ancient traditions and stories of battles in the air, may be resolved by the *aurora borealis*....which sometimes exhibits an activity of motion, concussion, and repercussion, which conveys an idea not very remote from military action ; in some parts of Europe this action has caused them to be called *merry dancers*.

Q. What accounts are there of them more modern ?

A. There are accounts of it so early as November 14, 1574 ; 6th March, 1716, which was

very brilliant ; but it does not appear either frequently or at stated periods, or of equal brilliancy.

Q. What is its elevation from the earth ?

A. That of 1737, was found by Boscovitch to be 825 miles high ; and M. Marian determines its mean height at 464 miles.

Q. How has it been accounted for latterly ?

A. The most satisfactory account is allowed to have been given by the venerable Franklin, in 1779, and demonstrates it to be the combined effect of rarefaction and condensation of the air, acted upon in the operation or change by electricity.

Q. When was it discovered in the south ?

A. By Captain Cook, the celebrated navigator, in 1770, and afterwards in 1773. The Aurora Australis was not tinged with red, but of a clear white, the corruscations of which were a sudden disappearance and reappearance, without the tremulous and vibratory motion which has uniformly appeared on the northern. It is not known to produce any effects on our earth or atmosphere.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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CLASS X....LESSON I.

OF GEOLOGY.

Q. AS in our early lessons we have treated of cosmography, or the system of the universal creation, and of geography, or the general distribution of the surface of the earth, we should now enquire concerning the composition and form and properties of the earth; under what heads shall we do this?

A. As astronomy describes the particulars of the heavenly bodies; and chemistry the properties of natural substances, so we should by geology, study the structure and formation of the globe, the materials of which it is composed, the changes it appears to have undergone; and this branch of science, with chemistry and mineralogy, render our knowledge of the substances of the earth clear and satisfactory; while botany, and the enquiries into animated nature, complete the whole.

Q. What is most remarkably deserving of regard in geology?

A. The phenomena which it presents to our senses, the solid masses of which our earth is composed, their variety and the consistency of their distribution, though in apparent disorder.

Q. What do you mean by a consistent distribution?

*A.* The depth into which men have penetrated into the earth is not very considerable ; but so far as they have gone, the appearances of strata and the uniformity of the masses has caused a classification to be made of all the masses into two kinds, 1. Primitive, 2. Secondary masses.

Q. Which are the distinct characters ?

*A.* Among the first are the rocks composed principally of silex, alumina, and magnesia ; making intermixed, granite, gneiss, mica slate, clay slate, primitive trap, siennite, topaz rock, quartz rock, flinty slate, porphyry, serpentine, and limestone of a particular character ; in the second class are placed secondary limestone, phosphate of lime, gypsum, sand stones, white stone, chalk, and flint.

Q. What characterises and distinguishes these primitive bodies ?

*A.* They form universally the fundamental rock, of the other class of all denominations ; they contain no petrifications, no mechanical deposits, but are throughout pure chemical productions ; there is a kind of middle class, which are, secondary porphyry, pearl stone porphyry, obsidian porphyry, siennite, and pitch stone, which contain a very small portion of mechanical deposit, yet are complete chemical formations, contain little carbonic matter, and never any petrifications.

Q. How are these beleived to have been so formed ?

*A.* They are beleived to have been formed after a great subsiding and a sudden rising of the waters, which are supposed to have covered the whole earth.

Q. What was the next stage ?

A. There is another semi-class, which precedes the secondary and completes the link, those are called transition rocks, because they are supposed to have had their origin when the face of the globe was changing from one condition to another, when the waters were subsiding and vegetation commencing.

Q. How are they distinguished?

A. In these the first slight traces of petrifications and mechanical deposits are found, they are transition limestone, transition trap, grey-wacke, and flinty slate; the petrifications found in this class are corallines, ecrenites, pertacrinites, entrochites, and trochites, the Darbyshire spar is of this character; and as the primitive were purely chemical, so here the secondary are chemical mingled with a small portion of mechanical depositions; and are supposed to have been produced by the dissolution of parts of the tops of mountains which, carried down by the waters, formed these compounds; they are usually found at the base of mountains, flat and of great extent and seldom of great height; the rocks called *foetz* rocks abound with these marks, and are usually found in horizontal strata.

Countries composed of these secondary rocks are not so rugged in appearance, nor so marked by rapid inequalities, as those in which the primitive and transition rocks prevail. The formations of the second class are supposed to be: 1. First or old red sand stone. 2. First or oldest *foetz* lime stone. 3. First or oldest *foetz* gypsum. 4. Second or variegated sand stone. 5. Second *foetz* gypsum. 6. Second *foetz* or shell lime stone. 7. Third *foetz* sand stone. 8. Rock salt formation. 9. Chalk

formation. 10. Floetz trap formation. 11. Independent coal formation. 12. Newest floetz trap formation.

Q. Whence arise these formations?

A. Supposing the whole earth covered with water, and gradually subsiding to its present state, the flowing of the waters from the highest acclivities must have carried down any soft or soluble matter; we know that there are shells of fish found on the highest mountains; and we find in the vallies remains of animals and vegetables; heaps of trees and plants; shells and other marine productions, vast horns of stags and skeletons of the mammoth, magalonyx, and elephant, and bitumenous fossils: the agency of heat and air acting on those bodies that had been covered by water, had a share in producing dissolution; and, as we find at this day, the rivers conveyed the particles so long as they had volume and force to keep them in solution till they were arrested by distribution over a large surface, or rolled so easily along as that their gravity deposited them; hence we find at the mouths of all large rivers, the Delta of the Nile, the Ganges, the Mississippi, islands formed from the deposits brought down by the waters; the soil thus formed is called alluvial, and of course of more recent formation.

Q. Do geologists distinguish each?

A. They divide them into two classes....1. Those which are formed in mountainous countries and found in vallies, composed of rolled masses, gravel, sand, fragments of metallic ores, sometimes loam, and different kinds of precious stones. 2. Those which are peculiar to low flat countries, loam, peat, sand, bog iron, breccia, ores of various kinds, tufa, and stalactite.

## CLASS X....LESSON II.

## MINERALOGY.

Q. In order to comprehend geology more distinctly, you say we must understand mineralogy ?

A. As geology treats of external appearances, and the great features of nature, mineralogy descends into particulars ; where geology stops mineralogy begins, and forms a more minute and particular science.

Q. In what does it consist ?

A. It is the art or method of describing mineral substances with so much accuracy and precision, that each may be distinguished from every other, by means of their external or physical characters ; and by examining them by aid of the art of chemistry.

Q. How is the subject arranged ?

A. Into four classes of substances—1. the earthy. 2. the saline. 3. the inflammable. 4. the metallic.

Q. How are the earthy class characterized ?

A. They compose the greater part of what geologists call the crust of the earth, and generally form a covering to the rest. They are not remarkable for being heavy, brittle, or light colored ; they are little disposed to chrystalize, are uninflamable, in a low temperature, insipid, and without much smell.

Q. What of the saline minerals ?

A. They are moderately heavy, soft, sapid, and possess some degree of transparency.

Q. The inflammable class of minerals ?

A. They are light, brittle, mostly opaque, of a yellow, brown, or black color, seldom chrystalized, and never feel cold.

\*Q. The metallic I suppose differ from them all?

A. They certainly do, for they are heavy, generally opake, tough, malleable, cold, not easily inflamed, and by exhibiting a great variety of colors of a peculiar lustre.

Q. Is this the only classification?

A. By no means; the particular fossils are so many that the classification is necessarily extensive and very minute in particulars; they are divided into genera, species, sub-species, and kinds; they are first described by their external character, which are either generic or specific; the generic character has no reference to difference of color, weight, or lustre; the differences in these properties belong to their specific character. Generic character may be either general or particular; in the first are embraced all that is common to minerals generally; in the last those that are found peculiar to some. The particular generic external character is also divided into: 1. Color, of which all minerals have some one or other: 2. Cohesion of parts into solid, friable, and fluid.

Q. How is color treated of?

A. The colors white, grey, black, blue, green, yellow, red, brown, have all a class of modifications of each; and besides these several colors and their shades, they are characterised as clear, dark, light, pale; they may have a tarnished appearance; a changeability, an eridiscence, an opalescence, a permanent alteration, a delineation of figure or pattern, as dotted, spotted, clouded, flamed, striped, veined, dendritic, or uniform.

Q. This must lead to great accuracy; is the cohesion of particles so clearly marked?



*A.* Equally so, and affording amusement and interest; the minerals are for this purpose divided into solid, friable, and fluid.

Q. How are the solid characterised?

*A.* Their parts have a strong coherence or hardness not easily movable, and in their external aspect three things are regarded. 1. the shape. 2. the surface. 3. the lustre; the shape again may be common to many, particular, regular, or extraneous; regard is had also to the fracture, and to certain circumstances of the touch. 1. hardness. 2. tenacity. 3. frangibility. 4. flexibility. 5. adhesion to the tongue. 6. unctuousity. 7. coldness. 8. weight.

Q. What of the friable minerals?

*A.* Their character is drawn from the shape, which may be massive, disseminated, thinly coating, spurious, or dendritic; from lustre, glimmering or dull, dusty or scaly; from soiling or coloring; and lastly, from their looseness or friability.

Q. What of the fluid minerals?

*A.* There are only two kinds, which include three varieties: 1. the lustre is either metallic as in mercury, or resinous as in rock oil. 2. transparency as in naphtha, turbid as in mineral oil, or opaque as in mercury. 3. fluidity as in mercury, or viscid as in mountain tar.

Q. Is there not a new quality in metallic substance?

*A.* You refer to potassium, that metal is very light, and when brought in contact with water dissipates in a bright flame.

Q. If the classification be not too extensive, or if it can be reduced, please to give an abstract of it?

**A.** The first class is earthy fossils, of which the genus are eight.

**Genus I. DIAMOND**, of which there is only one species, though it is divisible into kinds by variety of shades ; it is hard in the highest degree, and has been proved to be pure carbon, or charcoal.

**Genus II. ZIRCON**. 2 species, several varieties.

**Genus III. FLINT**. 34 species, as chrysoberyl, chrysolite, olivine, angite, vesuvianite, lewzite, melamite, garnet, pyrope, grenatite, spinelle, sapphire, corundum, diamond spar, emery, topaz, emerald, beryl, schorl, thumerstone, iron flint, quartz, horn stone flint, chalcedony, agate, heliotrope, plasma, chrysopras, flinty slate, cat's eye, prehnite, zeolite, cross stone, agate stone ; several of these have varieties, as the zeolite has five ; the schorl has two, one of which is the tourmaline ; the quartz has five, among which are amethyst, rock crystal, &c.

**Genus IV. CLAY**. 32 species ; jasper, opal, pitch stone, obsidian, pearl stone, pumice stone, felspar, four sub-species : pure clay, porcelain earth ; common clay, six sub-species, as loam, potter's clay, earthy, and slaty ; pipe clay, variegated clay, clay stone, clay slate : polier or polishing stone, tripoli, alum stone, alum earth, alum slate, bituminous slate, drawing or plate slate, whet slate, clay slate, lepidolite, mica or glimmer, pot stone, chlorite, horn blende, basalt, wacke, clink stone, lava, green earth, lithomarge, rock soap, yellow earth and umber.

**Genus V. TALC**. 12 species ; boles, asbestos, fuller's earth, actylonite, &c.

**Genus VI. CALE.** 20 species, among which are, chalk, limestone, marle, boracite, fluor, gyps several kinds, selenite, and cube spar.

**Genus VII. BARYTES.** 2 species: 1. witherite; 2. heavy spar, or baryte.

**Genus VIII. STRONTIAN.** 2 species: 1. strontian; 2. celestine; this has two sub-species; fibrous, of a color between indigo and bluish grey; massive and in plates. 2. foliated, of a milky white falling into blue, found in sulphur beds.

#### CLASS II. Fossil salts.

**Genus I. species 9.** Natron or natural soda, natural nitre, natural rock salt, natural sal ammoniac, epsom salt, glauber salt, alum, hair salt, rock butter, natural vitriol divided into three varieties, as iron, copper, and zinc, vitriol. Borax appears to belong to this class, and a new article found in Greenland, called stallite.

#### CLASS III. Inflammable fossils.

**Genus I.** Natural sulphur.

**Genus II.** Bituminous, bitumen, and coal.

**Genus III.** Graphite, 3 species, among which are mineral charcoal.

**Genus IV.** Rosin. 1 species, amber, white and yellow, 2 species, honey stone, melite.

#### CLASS IV. Metallic fossils.

**Genus XXI.** 1, platina; 2. gold; 3. mercury; 4. silver; 5. copper; 6. iron; 7. lead; 8. tin; 9. bismuth; 10. zinc; 11. antimony; 12. cobalt; 13. nickel; 14. manganese; 15. molybdena; 16. tellurium; 17. uranium; 18. chrome, &c.

## CLASS X...LESSON III.

## OF MINERALOGY.

Q. Is this the only classification of this branch of natural history?

A. No: like other sciences it is daily improving; there is another, by which it is divided into seven classes. The scientific men of various nations, have formed systems which approach very near to each other.

Q. As these are very important, and ought to be familiar to youth, please to give me some account of them?

A. The first class is earths, which are distinguished into five species....1. Friable, or what may be converted into powder, but do not harden in fire; 2. Calcerous, or chalk-like; 3. Gypseous, or such as may be converted into powder by fire, and then into stone by the addition of water; 4. Argillaceous, or such as hardened in the fire, as brick clay, pipe clay; 5. Fusible, or vitrifiable, such as instead of being changed to lime or powder by fire are converted into glass.

The second class is stones, of which there are also five species....1. Earthy, such as slates, and basaltes; 2. Calcareous, such as are reducible to lime by fire, as limestone, marble, tufa, stalactites, &c. 3. Gypseous stone, such as plaister of paris or gypsum, and alabaster; 4. Argillaceous, which do not soften in water and harden in fire, as soap-stone, asbestos, talc, &c. 5. Vitrifiable, or fusible, which give fire, as flint, diamond, and the most valued jewels.

The third class is salts. They dissolve in water, leave a strong taste upon the tongue, and

dissolve by fire without smoke. They are divided into three genera, the acid, the alkaline, and the neutral...1. Among the acids are the muriatic, the sulphuric, and the nitrous; 2. The alkalies, have potash, soda, and volatile alkali; 3. The neutral have common table salt, borax, nitre, &c.

The fourth class is bitumens, or combustible substances that emit smoke on exposure to heat; as petroleum or rock oil; amber, fossil pitch, and sulphur.

The fifth class is semi-metals, or minerals which have the appearance of metals, but are not malleable, or which will break under the hammer and become volatile in fire; among these are quick silver, antimony, zinc, calamine, bismuth and arsenic.

The sixth class is metals, or hard mineral substances, which will melt in the fire, bend and stretch under the hammer. These are gold, silver, copper, iron, tin, and lead.

The seventh class is denominated petrifications or substances which have been changed into stone from a former state, such as wood, skeletons of animals, shells, plants, &c. These are classed in a scientific manner....for example, petrified trees are called *dendrites*; animals, *zoolithes*; vegetables, *phyloetithes*; &c.

Q. What of the rich metal, Gold?

A. Gold is the heaviest, purest, and most ductile of all metals. It is chiefly found in mines, though sometimes gold dust is found in the sand and mud of rivers, particularly in Guinea; and hence the name of the largest British gold coin. There are gold mines in most countries in the world. The mines of Chili and Peru in Ame-

rica, are the richest, though very fine gold is found in some parts of the East Indies.

In the mountains of Thibet, or country of the Dali Lama, grains of gold are found in the rivulets and rivers ; in Ava, Pegu, and the islands of Java and Sumatra, gold is also found.

About the year 1800, a gold mine was discovered in Ireland, and seized upon by the government.

In our own country in 1803, a farmer of North Carolina discovered in a ravine made by the rain several grains of gold ; upon further search, he found a considerable quantity, and one lump of pure gold, the largest perhaps ever found in the natural state, of 50 pounds weight. From this gold some American eagles and half eagles have been coined.

In 1804, a mine had been opened in Chester county, about 15 miles from Philadelphia, in which a small quantity of gold ore was found, but not sufficient to reward labor.

Of all the properties of gold its ductility is the most surprising. A single ounce of gold may be extended by the gold beater's hammer to a surface of 150 square feet, and by the gold wire-drawers it can be extended to upwards of a thousand, yet remains so entire that the least flaw cannot be perceived, even by the help of the microscope.

Q. What have you to observe with regard to silver ?

A. Silver is a rich white metal, and next to gold the most ductile. There are silver mines in all parts of the world ; but those of Peru and some other parts of America, particularly those of Potosi, are by far the richest, and yield the

ore in as great plenty as when first discovered ; with this only difference, that the veins which were then almost on the surface of that famous mountain, are now sunk so deep, that the workmen go down to them by a descent of almost four or five hundred steps. Silver is found in quantities more or less blended with lead.

Q. What kind of substance is copper ?

A. It is a hard, dry, heavy, ductile metal, abounding in vitriol and ill-digested sulphur, and found in most parts of Europe, but particularly in Sweden. It is dug up in large fragments of ore, which are first beaten small, then washed to separate the earthy parts from it, then smelted and cast into a kind of moulds to form large blocks, called salmons, or copper cakes. This is the ordinary copper. There is a finer kind called rose copper, and a still finer called virgin copper, which is sometimes, but seldom, found pure in mines. It is the cheapest metal used for coin.

There are several copper mines in the United States, but the people are too happy and prosperous to render it worth while to work them.... and a vast encrease of population, or a great scarcity of copper in the commercial world alone can induce them to be fully wrought. The foreign export of the ore, appears to be at present the most eligible use of copper mines. The ore has been exported to England from a mine in New Jersey, with a handsome profit. Near Lake Superior, the finest copper ores on earth, were discovered by general Wilkinson of the United States' army, a few years ago.

## CLASS X....LESSON IV.

## MINERALOGY.

Q. WHAT kind of substance is iron ?

A. Iron is a hard, dry, fusible, and ductile metal, consisting of earth, salt, and sulphur, but all impure, ill mixed, and ill digested, which renders it liable to rust. By often heating it in the fire, hammering it, and letting it cool of itself, it is softened ; by extinguishing it when hot, in water, it is hardened. There are a great number of iron works in the United States..... Though iron is the cheapest, it is certainly the most useful of all kinds of metal, and seems indispensably necessary to the carrying on of every art and manufacture. Nay, it appears to be the great means of polishing and civilizing mankind ; at least, much more so, than the more precious metals. Pennsylvania and Maryland have the finest and greatest number of iron furnaces in the United States ; but there are a number of iron furnaces in the eastern and southern states also. There have been instances of nations possessed of great quantities of gold, and who yet remained in a state of barbarism : this, as is well known, was the case with the Americans, upon the first discovery of this country by Columbus ; but there never yet was an instance of a nation which understood the art of making or manufacturing iron, but attained, in time, to at least some degree of civilization.

Q. What kind of substance is lead ?

A. Lead is a coarse, heavy, soft metal, containing a little mercury, some sulphur, and a great deal of earth. It is found in most coun-



tries. The various purposes to which it may be applied are pretty generally known. The greatest lead mines in the world are in our new territory of Louisiana.

Q. What is tin?

A. It is a whitish metal, not so hard as silver, nor so soft as lead; but though not so soft, is yet more easily melted. The stannaries of tin mines in Cornwall and Devonshire, in England, furnish the greatest part of the tin that is consumed in all Europe. Six pounds of brasa, and fifteen pounds of lead, to an hundred pounds of tin, make the composition called pewter

Q. What is mercury?

A. Mercury, or, as it is vulgarly called, quicksilver, is an imperfect metal, neither ductile nor malleable, that is, neither capable of being drawn into length, nor spread into breadth by the hammer. It consists entirely of a fluid matter, resembling melted silver. It is found chiefly in Hungary, Spain, Italy, and Peru.—The greatest part of what is used in Europe is brought from the mines of Friuli in Italy, formerly belonging to Austria, now in the possession of the French.

The chief properties of mercury are, that except gold, it is the heaviest of all metals. It is also the most fluid of all bodies; that is, its parts cohere the least to each other, and are the most easily separated. It is extremely volatile, and may be turned into fume by a very gentle heat. It easily enters, and closely adheres to gold, less easily to silver, with difficulty to copper, and to iron not at all.

The weight of a cubic inch of each of the seven metals, viz. gold, mercury, lead, silver, copper, iron, and tin, is as follows:

	Oz.	Dr.	Gr.
Gold, - - - - -	12	2	52
Mercury, - - - - -	8	6	8
Lead, - - - - -	7	3	30
Silver, - - - - -	5	5	28
Copper, - - - - -	5	6	36
Iron, - - - - -	6	1	24
Tin, - - - - -	4	6	17

**Q.** What is the diamond?

**A.** The diamond, by the ancients called adamant, is the most valuable of all the precious stones. Its goodness consists in its water or color, lustre, and weight, and its defects are flaws, veins, specks of red and black sand, and a blueish or yellowish cast.

Diamonds are found at Golconda, and in the Bahar mountains in the East Indies, in mines very near the surface. A diamond is the hardest of all gems, insomuch that it can be only cut and ground by its own substance.

The manner of preparing diamonds is first to rub them hard against each other, and the dust which is thus rubbed off the stones, serves to grind and polish them; and this is done by means of a mill, which turns a wheel of soft iron, sprinkled over with diamond dust mixed with oil of olives. The same dust, well ground, and diluted with water and vinegar, is used in sawing of diamonds; which is performed with an iron or brass wire, as fine as hair.

There are many other precious stones; and I will give you the names and colors of some of the principal. The ruby, which is next in value and esteem to the diamond, is of a crimson color somewhat inclining to a purple. The garnet is somewhat like it, and perhaps of the same

species. The hyacinth is sometimes of a deep red, and sometimes of a yellow color. The amethyst is of a bright purple. The emerald a grass green. The beryl of a sea or blueish green. The sapphire, a sky blue. The topaz or chrysolite, is of a gold color. These are found in India and Brazil, and are all transparent.

There are others that are opaque, or only half transparent ; such as the cornelian, which is the best, and of a pale red, sometimes bordering upon orange ; the onyx, of a greyish cast ; the torquois, something between a blue and green ; and the lapis lazuli, which is studded with spots of gold, on an azure ground.

#### OF THE LOADSTONE.

Q. What is the magnet or loadstone ?

A. This wonderful stone is usually found in iron mines, and is produced in most parts of the world ; in China, Bengal, Arabia, Hungary, Germany, and England. It is a heavy stone, something resembling the ore of iron, only closer and more ponderous.

It is endowed with some surprising qualities and powers. It attracts iron, which will adhere to it very strongly ; and this virtue is also communicated to the iron so attracted. In every magnet there are two poles, one of which points northward, the other southward ; and if the magnet be divided into ever so many pieces, the two poles will be found in each piece.

It is this property which has rendered it so useful in improving the art of navigation ; for this gave rise to the mariner's compass ; by means of which, a mariner can now conduct his

ship to the East or West Indies, or even round the world, with as much ease, and as little danger, as he could formerly make a voyage along the coast.

Q. Have the improvements in ship building, kept pace with those in navigation?

A. They no doubt have. To be convinced of this, one need only consider the infinite difference there is between a first rate man of war, and an Indian canoe, which seems to be little better than a large butcher's trough; and yet this was probably the first form of all sailing vessels.

Even after men had learned to build ships with more art and of a larger size, they never ventured out of sight of land without fear and trembling; because they could not tell whether they were sailing east or west, north or south, or to what part of the world they were going; but now, by the aid of the *magnet* or *loadstone*, in the darkest night, and in the midst of the boundless ocean, they know the course they are steering, with as much certainty as if it were in broad day, and within sight of land.

## CLASS X...LESSON V.

## CHEMISTRY.

Q. CHEMISTRY appears to be now talked of more than any other science, will you give me some account of it?

A. It merits all the attention bestowed or that can be bestowed upon it, for it is the key to many other sciences, and has produced a more accurate knowledge of the operations of nature than was ever before known.

Q. What is its object?

A. The object of chemistry is to ascertain the properties of which all bodies are composed, and the manner in which they are combined with each other, and the properties they acquire by combination. Within the last 30 years only it has been carried to the greatest perfection, and the vast discoveries which it has led to, has not only rendered a new language necessary for the science, but it has exploded many principles as false, which were before considered as fixed.

Q. What is the best course to be pursued to obtain a correct knowledge of chemistry?

A. To take it up in small distinct parts, and pursue it step by step to greater extent; it may for this purpose be distributed into four branches. 1. What relates to simple bodies. 2. Compound bodies of two properties. 3. Compound bodies of more than two. 4. Bodies as they appear in the animal, vegetable, and mineral economy of nature.

Q. What do you call simple bodies?

*A.* Such bodies as have not been decomposed or reduced to more than one peculiar property, they are divided into six classes. 1. Oxygen. 2. Simple combustibles. 3. Metals. 4. Earths. 5. Caloric. 6. Light.

*Q.* Here I find some words that are new to me, but as you have said the knowledge of a science is the knowledge of the language of that science, pray what is the meaning of the word or nature of the simple body called Oxygen?

*A.* This substance was discovered by Dr. Priestly in 1774, and is named from two Greek words, signifying the property that produces acidity, because one of its qualities is, when combined with certain substances, to produce various acids, and such substances are called the bases of the acids so produced.

*Q.* Give me some example of this operation?

*A.* Take a glass tumbler and place some fresh leaves of any plant in it, then invert the tumbler in a bason of clear water, and expose it to the rays of the sun, there will appear to issue from the leaves through the water into the vacant part of the inverted tumbler, numerous bubbles of air, which collect in the top of the tumbler, and these are found to be oxygen gas, or oxygen in an aeriform state. The same kind of gas or air is produced by heating nitre in close vessels. Oxygen is absorbed by combustible bodies, and converts them into acids. It is essential to the process of combustion, as it unites with bodies that burn, and encreases their weight and changes their properties. It is also essential to respiration, as no animal can live in air which is deprived of oxygen.

Q. What do you call *caloric*?

A. It has been very common to confound cause with effect ; and thus light has been frequently treated as proceeding from the same cause as heat ; so, also, as was observed by the immortal Locke, when near the fire, we feel the sensation of *heat*, and then say the *fire is hot*... when in fact, there is no more heat in the fire, than there is pain in the needle that pricks the finger : *caloric*, then, is that matter in nature, which is the *cause of heat*...as *oxygen* is the cause of sourness, or acidity.

Q. How is this exemplified?

A. Dr. Franklin, in one of his letters, thus explains it : " While I am writing, part of my hand rests on the green cloth, and another, on the brass lock of my desk ; the cloth and the lock are undoubtedly of the same temperature ; yet the part of my hand which is on the lock, feels colder, and really is so, than the other part that rests on the cloth ; this is because the metal is a better conductor, and carries off the heat from my hand." The cause of this difference then, was, that the metal conducted the *caloric* out of the body, more than the cloth, and the cause of heat being withdrawn, the body from which it was withdrawn, became cold.

Q. What are the simple combustibles?

A. Substances capable of burning, which is combustion, there are five. 1. *Sulphur*, a hard brittle yellow substance without smell unless it is heated, and almost without taste. It is found both pure and mixed ; and by means of fire may be converted into an acid. 2. *Phosphorus*, which is never found in a pure state, but usually united with oxygen, and it is then called

phosphoric acid, which abounds in animal, vegetable, and mineral substances. 3. *Carbon*, commonly known by the name of charcoal, if a piece of wood be put into a crucible, covered with sand, and kept red hot, the wood becomes carbon, it being then freed from its earthy and saline parts. The precious gem, the diamond, is a perfect carbon. 4. *Hydrogen* is derived from two Greek words, signifying the capacity to produce water, it has been also called inflammable air; it may be procured in the state of gas, that is combined with caloric and light, by pouring sulphuric acid diluted with twice its weight of water on iron filings. This is the gas with which balloons are filled. All combustion ceases on plunging a burning substance into this gas; animals die in it almost instantly. It is produced from putrefaction, and by muddy or stagnant waters. Water was formerly considered as a simple element, but water is now found to be composed of the proportions of 15 parts hydrogen, and 85 oxygen. 5. *Azote*, so called from two Greek words, signifying *want of life*, because no animal can exist in it. It is produced by pouring diluted nitrous acid on muscular flesh, and applying a heat equal to 100 of Fahrenheit's thermometer.

Q. The next class of substances which come within the range of chemistry is that of metals, how are they described?

A. The distinguishing character of metallic substances is brilliancy or metallic lustre, opacity, fusibility, and until very lately a superior specific gravity over that of other bodies.

Q. How comes it that this was changed lately?

A. A discovery of metallic properties in a body before supposed to be of a different na-



ture, that is in common *potash*, the base of which is found to be a metal, and without the property of greater gravity, it being very light and taking flame when brought into contact with water.

Q. What is this metal called, and how many kinds of metals are there ?

A. This new metal makes the number 24—

1 Gold	9 Nickel	17 Tungsten
2 Platinum	10 Zinc	18 Molybdenum
3 Silver	11 Bismuth	19 Uranium
4 Mercury	12 Antimony	20 Titanium
5 Copper	13 Tellurium	21 Chromium
6 Iron	14 Arsenic	22 Columbium
7 Tin	15 Cobalt	23 Tantalum
8 Lead	16 Manganese	24 Potassium

The first ten of these, as well as the last, are malleable, or capable of being formed into shape by the hammer ; the next four brittle and easily fused or melted ; the rest are brittle and fused with difficulty. When oxygen combines with any of these metals, it is called an *oxyde* of that metal : thus the *rust of iron* is an oxyde of iron.

Q. Give me a brief account of each of those metals ?

A. Gold is well known ; it is the purest, most perfect and ductile, and unchangeable of the metals. It combines with a number of metals, and forms two oxydes, one purple and violet, the other yellow. 2. Platinum has been found only in South America, among gold ores ; and when pure, it is as white as silver, but not so bright. It is next to gold in malleability and ductility. 3. Silver is also well known for its whiteness and lustre ; it is ductile, malleable, laminable, and so tenacious, that a silver wire of one tenth

of an inch thick, will support 270lbs. 4. Mercury, vulgarly called quicksilver, is white and brilliant, unless exposed to 39 degrees of cold ; in which state, it may be hammered like common silver, without breaking. It combines with most metals, and in that state is called an amalgam. 5. Copper is also well known for its flexibility and usefulness, and mixes with most metals. It has two oxydes. 6. Iron is the most useful of all metals, and the most abundant, and is too well known to require description. 7. Tin is white like silver when fresh, but becomes dull from exposure to the air. It is easily melted, and is frequently mixed with other metals. It is found in England, Sumatra, Japan and in the Andes of South America. 8. Lead is also well known, and is, next to iron, the most abundant of all metals. 9. Nickel is a white metal resembling silver ; it is found in various parts of Germany, and is more malleable even than iron ; and like iron, is attracted by the load stone, and may be made a magnet of : when heated in an open vessel, it combines with oxygen, and assumes a green color. 10. Zinc is by some called a semi-metal ; it has never been found in Europe, but abounds in China ; it is a brilliant white, with a shade of blue ; and is composed of a number of lamina or leaves, adhering to each other. It is between the malleable and the ductile metals ; but wants their properties itself ; though it combines with other metals, and with great utility. 11. Bismuth is also a semi-metal, of a reddish or white yellow color, and lamellated texture, like zinc....it is hard and brittle, but will go to powder under the hammer. It is more fusible

even than lead. 12. Antimony is also a semi-metal, seldom found pure in its native state, but generally combined with sulphur; in which state it is called sulphate of antimony; and broken, presents a black grey color, with rays of bright lustre diverging in every direction, without any common centre. When separated from the sulphur by fire and iron, it is called regulus of antimony: it is a principal ingredient in types for printing. It is from this mineral that the Asiatic females paint their eyelashes black. 13. Tellurium is found in Transylvania, of a blueish white; it resembles regulus of antimony in its laminated form, but is very brittle. 14. Arsenic, a semi-metal, is found as an oxyde or calx; it is a deadly poison, and has the quality of destroying the magnetic virtue of iron and other metals. 15. Cobalt is used mostly in pottery works and as a kind of paint, it is found in various parts of Europe; its metallic properties are very imperfect. 16. Manganese is found in an oxide white, black, or red, and is reduced to the metallic state by an extraordinary heat only; it is used in bleaching and in many chemical uses. 17. Tungsten, found in Sweden, and in the language of that country meaning ponderous stone, this and the remaining imperfect metals are hitherto more curious than useful. Molybdenum is found in Swisserland, Saxony, and Sweden; Uranium is found in Saxony; Titanium is found in Cornwall, England; no heat at present known is sufficient to melt it. Chromium, Columbium and Tantalum are, like Pottassium, and two others called Sodium and Cerium, more curious than useful.

Q. What are the earths?

**A.** The earths we perceive in ordinary are all compounded substances ; but reduced by chemistry to simple elements, are found to be of 9 different kinds. 1. Barytes, 2. Strontian, 3. Lime, 4. Magnesia, 5. Ytria, 6. Glucina, 7. Zirconia, 8. Silica, 9. Alumine. Every body possessing the following properties is an earth: 1. Insolubility in water. 2. Little or no taste or smell. 3. Incombustibility. 4. A capacity when pure, of assuming the form of a white powder.

**Q.** You have mentioned the word caloric, and said it was different from *light* ; is not the cause of heat and light the same, or are they not the same thing ?

**A.** No....light is a different substance ; and each may be present where the other is not.... Light consists of small particles moving in straight lines from luminous bodies, with inconceivable rapidity. Without light, plants assume only a white color ; exposed to light, they assume all their natural diversities.

**Q.** What are compound bodies ?

**A.** They are divided into two classes ; those of two bodies united, and those of more than two : of the first class there are five kinds. 1. Water, 2. Alcohol. 3. Oils. 4. Alkalis. 5. Acids.

**Q.** Is water, then, a compound body ?

**A.** Water, as well as earth, air, and fire, is composed of more than one property or substance, it is found in four circumstances, solid, or as ice....liquid as we see it flowing....vapor, as we see it in steam, smoke, clouds....and in combination with other bodies ; deprived of caloric, it becomes ice, and restore to it caloric, and it becomes fluid again.

**Q.** What is alcohol ?

*A.* Brandy, and what are called spiritous liquors, are composed of alcohol, water, and a small portion of some essential oil, which makes the difference between the different kinds of ardent spirits. It is sometimes called spirits of wine; and is composed of carbon, hydrogen, and oxygen.

Q. What of oils?

*A.* They are of two classes; fixed and volatile. The first are procured by expression from animal and vegetable substances; the other by distillation. They appear to be composed of carbon and hydrogen.

Q. What are the alkalis?

*A.* Substances possessed of these properties:  
1. Incombustibility. 2. The quality of converting vegetable blues into green. 3. A hot caustic taste. 4. A high degree of solubility in water.

Q. Are there many alkalies?

*A.* There are three: potash, soda, ammonia. The two former are found, however, to have metallic bases; and are called potassium and sodium. The two first have been called fixed alkalies; the last volatile, because the violent heat was necessary to volatilize the former; and the latter easily assumes the gaseous form.

Q. Whence are they produced?

*A.* Potash is produced by burning wood to ashes; repeatedly washing the ashes till it comes off free from taste: the water that tastes, is called a lye, which is boiled until the potash is deposited in small, imperceptible crystals, like salt. The difference between it and soda is, that the latter is obtained from plants which grow in, or near the sea. The union of soda with fat, makes hard soap; with potash, soft soap.

Q. How is ammonia produced ?

A. By distillation from the horns and hoofs of animals, on which account it is sometimes called *hartshorn*, being distilled from the horns of that class of animals ; it is called ammonia, from having been distilled from *sal ammoniac* ; distilled it rises in the form of a gas, but is rapidly absorbed by water, in which form it is sold in the shops.

Q. What are the acids ?

A. Acids consist of a certain base united with oxygen, which is the cause of acidity. The bases of the sulphuric, nitric, phosphoric, and arsenic acids, are known ; and it is also known that hydrogen, carbon, and oxygen, form the bases of the vegetable acids : and that the same substances combined with nitrogen, constitute the animal acids ; but the bases of the muriatic, boracic, and fluoric acids, are not known. Acids are either solid, liquid, or gaseous. They excite a particular sensation on the palate called sourness ; and they change most of the blue vegetable colors to red. Most of them unite with water in all proportions. They combine with the alkalies, and are then called neutral salts ; which are distinguished by two forms of expression ; one designating the acid, the other, the alkaline base. The termination *ate* is used when the acid ending with *ic*, is completely saturated with oxygen : thus salts combined with the *nitric acid*, are called *nitrates*. Words ending with *ite*, designate those weak acids, which are not fully saturated with oxygen ; and which, when alone, have the termination *ous* ; thus, *nitrites* or salts, compounded with nitrous acid.

All metallic bodies combine with acids. The following are the acids at present known :

*Mineral acids*....Sulphureous, sulphuric, nitrous, nitric, muriatic, oxygenated muriatic, hyper-oxygenated muriatic, carbonic, fluoric, boracic, mellitic.

*Metallic acids*....Arsenous, arsenic, tungstic, molybdic, chromic, columbic.

*Vegetable acids*....Acetic, malic, oxalic, citric, tartaric, benzoic, camphoric, gallic, succinic, suberic.

*Animal acids*....Phosphorous, phosphoric, sebatic, laccic, lactic, saccho-lactic, prussic.

Q. What of the compound bodies ?

A. Those bodies of the first order, contain three classes : 1. Soap. 2. Neutral salts. 3. Hydrosulphurets. Oils taken into compound without decomposition of parts, are called soaps; they are both alkaline and acid. The word salt, in chemistry, has a very comprehensive, but not strict sense; as it embraces every substance that is sapid, easily melted, soluble in water, and not incombustible; and the term neutral salt, applies to any substance compounded of acids and alkalis, earths or metallic oxyds. In these compounds, the earth, alkali, or oxyde, is called the *base*. Each order of salts is denominated after the acid which enters into its composition; and every salt is distinguished by subjoining the name of its base. Thus all the salts into which sulphuric acid enters, are called *sulphates*....and the salt formed by the combination of sulphuric acid and potash, is called sulphate of potash.

AN EPITOME  
OF THE  
*ARTS AND SCIENCES.*

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## CLASS XL...LESSON I.

## OF BOTANY.

Q. WHAT is understood by Botany?

A. That part of natural history, philosophy, or physics, which treats of plants and vegetation. It is curious and useful, and a source of inexhaustible delight.

Q. Is it not reduced to a particular system?

A. It has been in the ablest manner by Linæus, a Swedish physician, who has divided all plants into twenty-four classes, each of which is sub-divided into orders and genera; and he has shewn that vegetables bear a strong analogy to animals; possessing sensation or life, and that they are of different sexes.

Q. What, trees and flowers and herbs have life and be of different sexes?

A. Certainly, the goodness and wisdom of God are to be seen in his minutest works.

Q. How are plants known to be of one or another sex?

A. By marks peculiar to each.

Q. Which are they?

A. Those which have a stamen or males, because it secretes a fine juice which turns into a fine dust; this nature has contrived shall be deposited on the tips or apices of the pistil of



the female plant. The pistil consists of three parts, the germen, style, and stigma, each of which has its uses.

Q. What are the twenty-four classes which you say comprehend all plants and vegetables ?

A. They are described by Greek words, expressive of their nature, which those who attend to their learning soon know.... The first class, is *Monandria*, which signifies in Greek *one man* ; so the classes go on ; 2, *Diandria* ; 3, *Triandria* ; 4, *Tetandria* ; 5, *Pentandria* ; 6, *Hexandria* ; 7, *Hepandria* ; 8, *Octandria* ; 9, *Euneandria* ; 10, *Decandria* ; 11, *Dodecandria* ; 12, *Icosandria* ; 13, *Polyandria* ; 14, *Dydinamia* ; 15, *Tetradynamia* ; 16, *Diadelphia* ; 17, *Polyadelphia* ; 18, *Syngenesia* ; 19, *Gynandria* ; 20, *Monoecia* ; 21, *Dioecia* ; 22, *Polygamia* ; 23, *Cryptogamia*. The best book for youth to learn more of Botany is Dr. Barton's concise treatise.

Q. Is not Botany a part of the professional study of physicians ?

A. A knowledge of Botany is very necessary to physicians, because there are so many medical plants, which it is proper for them to know the nature of before they administer them.... The greatest Botanists have been physicians ; and lectures on Botany always form a part of the course of medical studies.

Q. Can you name any particular plant that is distinguished in Botany and Medicine ?

A. Several....the *Palma Christi*, from whence is extracted Castor Oil, one of the most safe and valuable medicines, which may be raised in any quantity in all parts of the United States. There is the Chamomile also to be had in our meadows ;

in the West Indies they have the valuable vegetable called the Arrow Root ; and in South America the Cinchona, or Jesuits bark.

Q. Do you recollect any others ?

A. Yes, there are various plants useful for the comforts of life, and for commerce. Our country is celebrated for its tobacco ; and our new territory of Louisiana affords the sugar cane ; the vine is a native of the United States, and there are several species of it from which good wines have been made ; the coffee and the tea tree would thrive in our southern country.

Q. You do not notice any trees ?

A. We have trees ornamental and useful, equal in number and in size to any in the world ; our oaks and hickory of various kinds ; our maples and magnolias ; our pines and poplars are celebrated.

Q. What kind of tree is the oak ?

A. It is one of the largest and most useful of all vegetables ; it is the strongest and most durable of all timber ; and will continue firm and sound, either in air or water, longer than any other wood, excepting the Teak of the East Indies. Hence the great value it is of to ship-builders, carpenters, and other architects. It is produced from the acorn, a small fruit which it bears, and it is said by naturalists to grow three hundred years.

Q. What is a vine ?

A. The vine is a plant or shrub of the parasite kind, supporting itself by creeping or climbing up any thing that stands near it. It is famous for its fruit, called grapes, which it produces in bunches, and from the juice of which wine is made ; dangerous when men drink it to excess ;

but temperately used, its virtues cheer the heart, and enliven the imagination.

The best situation for a vineyard, is a dry soil, on the side of a hill. There are various kinds of wine, which are generally denominated from the places where the vines grow. Thus, Port comes from Portugal; Madeira, from the island of Madeira; and Burgundy and Champagne, are the produce of France; the grape best adapted to the United States, is that from which the Constantine wine is made, it stands the severest seasons of our climate.

Q. What have you to say of the coffee tree?

A. It is the tree that bears the coffee berries. It grows very plentifully in Arabia, and is also cultivated in Turkey, some parts of the Levant, and in the West Indies. The size of the berries is something bigger than our largest peas; the flower is like the white jessamin flower, and the leaf like that of the bay.

The berries are of a pale color, and imported to us as they are gathered from the tree; but before they can be used to make the liquor which we call coffee, they are roasted in iron boxes, till they become a deep brown color, and then ground in a mill, to powder.

Q. What have you to observe concerning the tea tree?

A. The tea tree grows in China, Japan, Siam, and other parts of the east. It delights in valleys, and a stony soil. That which is imported to us, and of which we make tea, is only the leaves. They are gathered by the natives, in March and April, held over the steam of boiling water to moisten them, and then laid on copper plates, and dried before the fire, which curls them in the manner we see.

Its seed is usually sown in places exposed to the south ; and the tree bears three years after sowing. The root is something like that of the peach tree ; the leaves are about an inch and an half long, narrow at the point, and jagged all round. Its flower resembles the wild rose ; which, when blown, is succeeded by a pod, not exceeding the size of a hazle nut, containing two or three seeds, from whence the plant is propagated. The tree is said to be of various heights ; even from one foot to fifty.

## CLASS XL...LESSON II.

## OF BOTANY.

Q. WHAT are the chief properties of the tobacco plant?

A. The tobacco plant is cultivated in the southern states; the greatest part of which is exported to Europe. It likewise grows in other parts of the world, in most of the islands of the West Indies, and particularly in Tobago, whence it had its name. It is cultivated in the Ukraine, or south of Tartary. In Hindustan it is universally cultivated; the tobacco of the district of Bilsah, bears double the price of all other tobacco. It is propagated from seed, which is sown on pretty good ground, and, for some time, watered every day. In very hot weather, it is protected from the heat of the sun by branches of trees, or mats, thrown over it, and supported by upright sticks.

When it has risen to a certain height, they prepare a piece of ground for its reception, and transplant it like lettuce; after which it is carefully weeded. The lower leaves are broken off, that they may not hang upon the ground and rot; and when it begins to shew its flower, the heads also are cut off, that only twelve or fifteen of the principal leaves, receiving all the nourishment, may grow larger and of a thicker substance.

When ripe, the stalks are cut down, and hung up two by two under some shed or shelter from the sun and rain, and dried by the air for fifteen or twenty days. When the leaves are sufficiently dried, they are pulled from the stalks, made

up into bundles, which, being wetted with water, are twisted into rolls, and in this manner exported to Europe; where the tobacconist with an engine cuts it for smoking, or grinds it for snuff, according to his occasion.

This plant was first carried to England by sir Walter Raleigh, in the reign of queen Elizabeth, which gave occasion, it is said, to the following curious incident. One morning while he was smoking a pipe of tobacco in his closet, (a thing unknown to every body in England but himself) his servant entered with his breakfast, (consisting of a tankard of ale and a toast; for the use of tea was then unknown) and observing sir Walter surrounded by a cloud of smoke, imagined that by some unlucky accident he had caught fire; upon which he threw the tankard of ale in his face, and ran out of the room, exclaiming that his master was all in flames.

Q. Is not the sugar-cane a very curious plant?

A. It certainly is: it is produced in many parts of the West Indies, particularly the Caribbee islands, as Barbadoes, Jamaica, St. Christopher's, &c. It usually grows five to eight feet high, and is about an inch in diameter.... The stem, or stock, is divided by knots several inches apart. At the top it puts forth a number of long green leaves, from the middle of which arises the flower and the seed. When ripe, which is commonly in about ten months, it is found quite full of a white juicy pith, which is broken into a pulp from which is expressed the liquor whereof sugar is made.

The process of making sugar is as follows: after the cane is cut, they are carried in bundles

to the mills, which consist of three wooden rollers, covered with steel plates, and is wrought by water, or wind, or cattle, or slaves. The liquor, when the canes are broken and pressed between the rollers, runs through a little canal into the sugarhouse, and is conveyed into a copper heated by a slow fire, just to make it simmer, where it receives its first separation. With the liquor is here mixed a quantity of ashes and quick lime; the effect of which mixture, assisted by the action of fire, is, that the unctuous parts are separated from the rest, and raised to the top in form of a thick scum, which is constantly taken off with a skimmer.

This done, it is further purified in a second, third, fourth, and fifth boiler, in which last it is brought to the consistence of a syrup. Then in a sixth boiler the syrup receives its full coction; and here all the impurities left by the former lees are taken away by a new lee, and a water of lime and allum is cast into it.

In this last copper there is scarce found one-third of what was in the first, the rest being wasted in scum. By thus passing a number of coppers, the sugar juice is purified, thickened, and rendered fit to be converted into any kind of sugar.

Q. Are there not many useful or curious trees or plants besides those you have mentioned?

A. Most certainly; the cabbage-tree answers most of the purposes of table greens; the bread-fruit-tree; the Cocoa or Palmyra Palm tree furnishes food, timber, the materials for fire, oil, paper, and cordage.

## CLASS XI....LESSON III.

## OF ANIMATED NATURE.

Q. HOW do you arrange animated beings?

A. Into classes, which are determined either by the forms of the animals or other particulars, as men are erect and two legged, with hands and organs of speech ; beasts are four legged and hairy ; birds are feathered and winged ; fishes are finned and scaly, without legs : reptiles are, like fishes, without legs ; insects are many legged and winged.

Q. Then there are six classes, mankind, beasts, birds, fishes, reptiles and insects....do these comprehend the whole animal creation ?

A. No....there are animals which partake of some particular characteristics of two or more of these classes ; for example, the monkey species have hands, and in many other respects approaches to the resemblance of the human form ; bats partake of the qualities and features of birds and beasts ; the hippopotamus and seal partake of the nature of beasts and fishes ; and the alligator and crocodile of the qualities of fishes, reptiles and quadrupeds. There are other deviations from the ordinary classes of animated beings, which belong to a more advanced period of study.

Q. Is this arrangement conformable to the systems of naturalists ?

A. It is not strictly conformable to any that I am acquainted with ; but it appears to be conformable with reason and good sense.

Q. Do not naturalists describe this branch of knowledge under a particular name ?



**A.** Yes....they call it Zoology, which means a discourse on animals or living creatures ; the author of which is Charles Van Lin, commonly called Linnæus ; his system of Zoology is divided into six classes....1, *Mammalia* ; 2, *Aves* ; 3, *Amphibia* ; 4, *Pisces* ; 5, *Insecta* ; 6, *Vermes*.

**Q.** As the system of Linnæus is the most generally adopted, give me some particulars of this classification.

**A.** The first class, *Mammalia*, which is derived from the Latin word which signifies the *pups* or breasts ; comprehends all animals that *suckle* ....and it contains seven orders.

1. *Primates*, animals that have two canine and four cutting teeth ; of this order there are only three genera....1, Man ; 2, Monkeys ; 3, Bats.

2. *Bruta*, that have no cutting teeth, as the elephant.

3. *Fera*, that have ten cutting teeth, as the lion.

4. *Glires*, two cutting teeth and two canine teeth, as the hare.

5. *Pecudes*, that have no cutting teeth in the upper jaw, as sheep.

5. *Bellua*, animals that have hoofs, and cutting teeth in both jaws ; such as the horse.

7. *Cete*, or whales.

**Q.** Then it appears that the whale is ranked among the animals that are suckled when young?

**A.** Yes....and some other marine animals.

**Q.** I wish to have a more particular discrimination made between the classes of animals, so that their different characters may be more clearly understood.

**A.** Man is distinguished by the reasoning faculty....Beasts, by living on land, and being

either subject to, or at war with man....Birds flying in the air, or living domesticated with man....Fishes by living in the water....Reptiles living either by land or water....and insects living in the air, water, or on the earth.

Q. What is the principal distinction among beasts ?

A. The first is that of the whole footed, such as the horse, ass, mule, zebra.

2. The cloven footed, as the ox kind, the bison, buffaloe, sheep, goat, antelope, the camel, dromedary, the goraffe, camelopardel, and musk.

3. Those that never shed their horns, among which are, all of the ox kind, and antelope, sheep, and goats.

4. Those that shed their horns or teeth, as the deer kind, buck, elk, rein-deer, and elephant.

5. The tusked animals, as the elephant, rhinoceros, tapir, hippopotamus, and we make a separate class of the wild boar, hog, peccary, and babyroussa.

6. Animals of the dog kind, which have claws but not hoofs, as the great variety of dogs, the wolf, fox, hyena, &c.

7. Those of the cat kind, as the domestic cat, tyger, panther, lion, ounce, lynx, leopard, &c.

8. The short legged quadrupeds, as the weasel, ermine, ferret, martin, sable, rabbit, &c.

9. Those of the furred kind, as the bear, beaver, badger, racoon, &c.

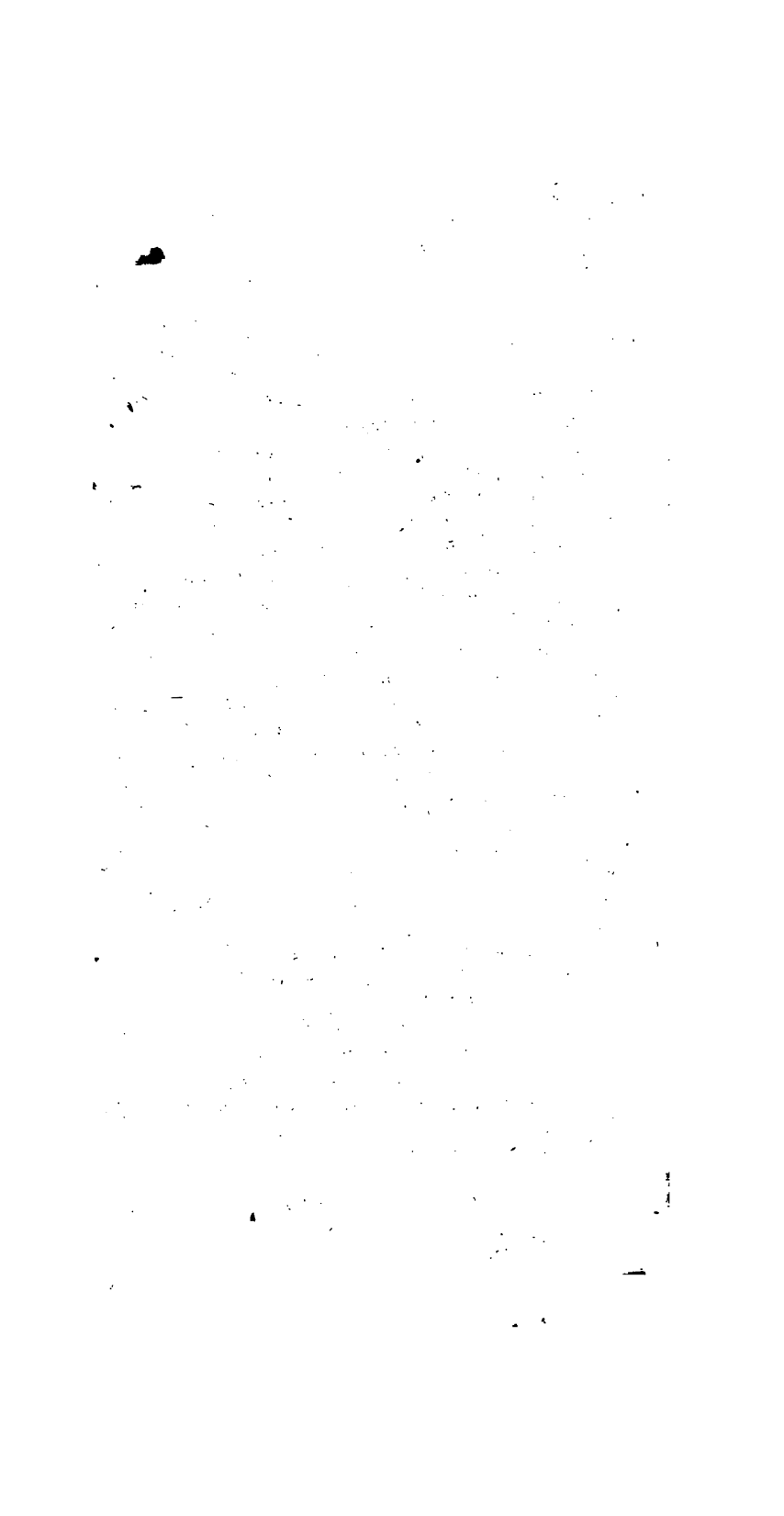
Q. I wish you to describe a few of the most worthy of notice ?

A. Animals of the ox kind, as the bull and cow, are the first in rank as to beauty, service, and size. There is no part of the animal with-

out utility ; in many countries they perform all the work of carriage and draught ; while living, the milk, cream, whey ; when dead, the blood, fat, marrow, hide, hoof, horns, urine, liver, gall, spleen, bones, have their several and certain uses and value ; vellum and gold beater's skin, is obtained from those animals ; their hair is useful to builders, and their horns, for various species of manufacture.

The cow, which furnishes the materials for the dairy, deserves most regard ; it is described scientifically cloven footed ; horned ; horns bending laterally ; eight cutting teeth in the lower jaw, none in the upper ; it is a hardy animal, little regardless of the quality of food if supplied abundantly, but delights in rich pasture. It is an ancient inmate of every climate, domestic and tame in civilized countries ; savage and wild in wild countries, but useful in all. In Europe, and where domesticated in the United States, the species is either red, black, or a mixture of red and white, or white and black ; in Asia the tame species is wholly white, and have a large fleshy substance above the fore shoulders, called a hump ; the wild species are enormously large, and of a brown or dun color.

The horse by his speed surpasses the ox, but next in usefulness is the sheep, which is described with horns spiral or curved outward or backward ; in the lower jaw eight cutting teeth, the upper none. Their great value arises from their fleeces, of which the various kinds of sheep produce wool of different qualities. The fine fleeced sheep were peculiar to Europe, those of Spain the most admired ; but more pains are bestowed on them in England. The breed of this fine





**THE OX.**



**THE SHEEP.**



THE CAMEL.



THE DROMEDARY.



fleeced sheep encreases daily in the United States, and the markets within a few years yield mutton equal to any in the world.

The kinds of sheep are very numerous....the value of those of the best fleeces may be judged by what Mr. A. Young says of those of England, in his work called a "*Six Months Tour.*" There are manufactured in Great Britain and Ireland 466,532 packs of wool; and exported unmanufactured 285,000 packs; which at £7. sterling, (or thirty-five dollars) amounts to £5,260,724 (or 26,303,620 dollars)....the value of the manufactured wool is about £12,434,855, (or dollars 62,174,275) annually circulated among industrious artisans. The artisans employed 1,557,834 people out of the whole laboring classes.

Q. Give me some account of the useful animals of other countries, the camel for example?

A. There are several of the camel kind, but two are pre-eminently distinguished. The Arabian camel and the dromedary. The former has two elevations or fleshy substances, is a native of the ancient Bactria, (modern Toorkistan:) the latter is a native of Arabia.

The Arabian camel possesses the various qualities of the horse, the cow, and the sheep. It is figuratively called the ship of the desert, because it travels over the sands of Asia and Africa for several days without food or drink; with the camel the Arab will travel fifty leagues of a day, where there is neither verdure to refresh nor shade to shelter, where nothing is visible to the eye but sand, void, naked, and solitary. With this animal trade is carried on between Asia, Africa, and the Mediterranean....and even to



**China.** A camel will carry from 100 to 1200 pounds weight.

The dromedary differs only in the single tuft or rump from the camel....their nature and uses are the same.

The *Lama* of South America is of this species, and though not much larger than a full grown deer, is employed as a beast of burden on the Andes.

Q. You have mentioned the deer, let me have some account thereof?

A. I select the fallow deer, as one of the most beautiful of the kind. It differs from the stag only in size and the shape of the horns, which are smaller, and are shed annually. They are easily tamed. The varieties of the deer kind are numerous; but the most worthy of note is the Elk, the largest of the kind, which abounds on our continent, and is frequent in Canada. The rein deer, moose, antelope, ibex, tibet, are all of this species....

Q. Give me some account of the white bear and panther?

A. The white or polar bear, differs from the brown bear of our woods, as well in its length of head and neck, as by growing to double the size; some of them are thirteen feet long.... Their limbs are of great size and strength; their hair long, harsh, and disagreeable to the touch, and of a yellowish white color; their ears short and rounded, teeth large; they inhabit the coldest parts of the globe, having been found in 80 deg. north latitude. They are often seen on those masses of ice which separate from the continents of the north, and are drifted southwardly; but are seldom met on





**THE DEER.**



**THE WHITE BEAR.**



THE ROYAL TYGER.



THE CONDOUR.



1. The first part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for consistency and thoroughness in record-keeping, as this is essential for the proper management of the business and for the preparation of financial statements.

2. The second part of the text describes the various methods used to collect and analyze data, including surveys, interviews, and focus groups. It highlights the importance of using a variety of methods to ensure that the data is comprehensive and representative of the population being studied.

3. The third part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for consistency and thoroughness in record-keeping, as this is essential for the proper management of the business and for the preparation of financial statements.

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5. The fifth part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for consistency and thoroughness in record-keeping, as this is essential for the proper management of the business and for the preparation of financial statements.

6. The sixth part of the text describes the various methods used to collect and analyze data, including surveys, interviews, and focus groups. It highlights the importance of using a variety of methods to ensure that the data is comprehensive and representative of the population being studied.

7. The seventh part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for consistency and thoroughness in record-keeping, as this is essential for the proper management of the business and for the preparation of financial statements.

8. The eighth part of the text describes the various methods used to collect and analyze data, including surveys, interviews, and focus groups. It highlights the importance of using a variety of methods to ensure that the data is comprehensive and representative of the population being studied.

9. The ninth part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for consistency and thoroughness in record-keeping, as this is essential for the proper management of the business and for the preparation of financial statements.

10. The tenth part of the text describes the various methods used to collect and analyze data, including surveys, interviews, and focus groups. It highlights the importance of using a variety of methods to ensure that the data is comprehensive and representative of the population being studied.

land south of the island of Newfoundland; but are abundant on the shores of Hudson's Bay, Greenland, Spitzbergen, &c.

The panther differs from the tyger, only in its being something smaller and the skin spotted; whereas the tyger is streaked. Its cruelty and hostility to man is the same; and its aversion extends to the monkey, in search of which it will climb trees. The panther is found principally in Africa, the tyger in Asia; but both are found in both quarters of the world. They are all of the cat kind. The American tyger, which is called Couzar, is said to partake of the appearance of the lion also, and to prey upon deer and other animals.

Q. This much will serve for an introduction to this branch; the second branch of zoology, is aves or birds; has it not a classical name?

A. Yes: it is called ornithology, and is divided into six classes.

1. *Accipitres* or the *rapacious* kind, which live upon flesh, prey upon other animals; and are known by their strong hooked beaks, muscular legs, strong talons, strength, and ferocity.

2. *Pica*, or the *pie* kind; which feed miscellaneously, and their females being fed by the males in breeding time; they have convex and compressed beaks.

3. *Aseres*, or the *poultry* kind; with fat muscular bodies, pure white flesh: unlike other birds, promiscuous in the choice of their mates; their beaks are various, depressed, dentated, or serrated.

4. *Scolopaces*, or the *sparrow* kind; mostly vocal and beautiful plumage; food, seeds and insects; while rearing remarkably fond and faithful; their beaks are subcylindric and some obtuse.

5. *Gallinæ*, or the *duck* kind; distinguished by their beaks, which serve them as food strainers; by webbed feet, which enables them to swim and remain on the water, their beaks flat, conical, and some crooked.

6. *Passeres*, or *crane* kind; long penetrating bills, which enable them to search in the waters for food; long limbs.

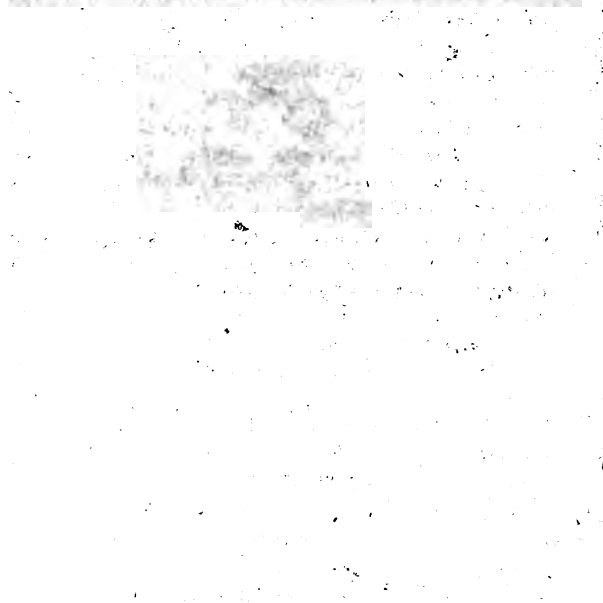
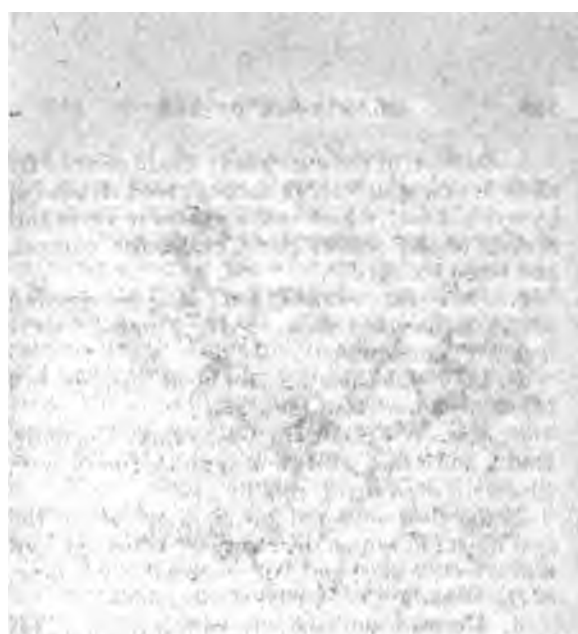
Q. Are there not several birds that do not belong to either of these classes?

A. Yes....the Ostrich, Cassowary, Condour, Dodo, and some others of extraordinary size, which disables them from flying.

In the description of birds, the beaks is the first object by which the character is determined ....the feet, wings, and tail, successively follow.

Q. What kind of bird is the Condour?

A. No bird can compare with it for size, rapacity, strength, or swiftness; in force and vivacity it surpasses the eagle, its bald head and neck have caused it to be classed with the vulture. It is very rare in all parts of the world, but is sometimes seen in our own country. One of these birds, shot on the coast of Chili, South America, was measured, and the wings from one extremity to the other were 16 feet. One of its quills was an inch and an half in circumference. Naturalists suppose this bird to be the *Rock* of which marvellous tales are told in the Arabian fables.







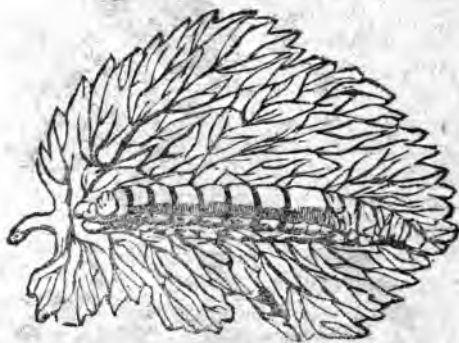
**THE COCK.**



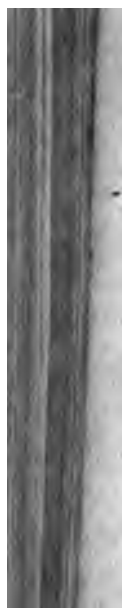
**THE HERON**



THE FLIMANGO.



THE SILK WORM.



## CLASS XL...LESSON IV.

## OF ANIMATED NATURE.

Q. GIVE me some account of the domestic cock?

A. This bird in its native forests is not so beautiful as in its reclaimed state. The species yet inhabits the woods of Asia, in natural wildness, and often deceive the foreign traveller at night by his crowing, into a belief that civilization is near at hand. The largest birds of this kind are brought from Ava and Pegu; the smallest from Bantam and other islands in the Indian archipelago. A barbarous passion prevails in some parts of the world, in provoking the cock to combat with one of his species; refinement in cruelty has enlisted art in this inhuman sport, and affixes steel spurs to the heels of the animals, whose females exhibit the most affectionate examples of maternal assiduity and love, in her care of her eggs and the clutch of her chickens.

Q. Give me some account of birds of the crane kind?

A. The heron is the most numerous in its kinds; there are no less than 47 sorts of heron, varying in size, plumage, and figure, but all of the same manners, their general character cowardice, rapacity, indolence, and insatiable hunger. The heron lives chiefly in pools and marshes; builds in the tops of trees and cliffs.... its food frogs, fish, and the like.

Q. What of the flamingo?

A. It is an American bird; seen in great flocks in Canada and to the northward of our

lakes. They live by the shores of seas and deep waters, and at the mouths of rivers; and their shape is fitted for their mode of life, the body is as large as that of a goose; but standing on the shore from the length of its legs appears very stately, as the shape of its body is delicately molded; the plumage of the body snow white; the wings a bright scarlet, and the long feathers of the wings a jet black; the beak is blue. The legs and thighs usually about two feet eight inches long, and not thicker than the human finger; the neck nearly three feet; the toes are webbed like those of a duck.

Q. Give me some account of the *amphibia*, or third class?

A. There are comprehended in this class (the word implies *two ways of life*) all animals that live upon land and in the water; they are divided into two classes.

1. Such as live principally upon land, and go occasionally into the water; as the hippopotamus, beaver, seal, otter, tortoise, &c. &c.

2. Such as live principally in the water, but go occasionally to land, as eels, water-snakes, &c.

Q. What is the scientific term under which the study of the fourth class *pisces*, or fishes, is designated?

A. *Ichthyology*, which is distributed into four orders, which are distinguished by the conformation or want of fins.

1. *Apodees*, of which the eel is an example.

2. *Jugulares*....the cod.

3. *Thoracia*....the perch.

4. *Abdominales*....the salmon.

From this arrangement the whale and dolphin is excluded, they being classed under *Mammalia*.

*Pennant*, an English naturalist, has given another arrangement into three classes, each of which comprehends several genera. They are: 1. *Cetaceous*, as the whale; 2. *Cartilaginous*, as the picked dog fish; 3. *Bony* or *spinous*, as the cod.

Q. How is the fifth class of Zoology denominated?

A. The natural history of insects is denominated *Entimology*, and comprehends many thousands, but is generally understood to be confined to all that class of animals which have six or more feet.

Q. The sixth class cannot be so numerous as the last?

A. No; but it is subdivided into six simple orders. 1. *Intestina*, as the earth-worm; 2. *Molusca*, or the naked snail; 3. *Testacea*, as the shelled snail; 4. *Infusiona*, as the water worm; 5. *Zoophyte* or polype.

Q. I wish to obtain some account of a few of the most curious subjects of *Entimology*?

A. Insects are in their nature most curious, from the mutability in their existence, and the wonderful change which they undergo. What a scene of wonders does not the butterfly display! Its eyes of net work, its wings besprinkled with farinacious dust, of which every grain is a tile laid over a fine net of gauze; and the infinite variety of form, color, richness, beauty of its embellishment. This beautiful tribe is divided into the nocturnal and diurnal, or the butterflies and moths. Of the latter is the *silk worm*, of which there are many varieties; there are three silk worms natives of Pennsylvania, and from some of which silk of a beautiful fabric was

procured thirty years ago under the care of Dr. Franklin.

Its history is this....when the worm leaves the egg, it feeds upon mulberry leaves ; it is at first small and black ; in a few days it assumes a new habit ; while tinged with the color of its food ; and before it goes into the chrysalis state assumes two other dresses. When this state commences, the insect proceeds to spin its silk, which becomes its tomb ; and in a short time becomes the cradle of a new insect, which bursting its tomb, takes wing.

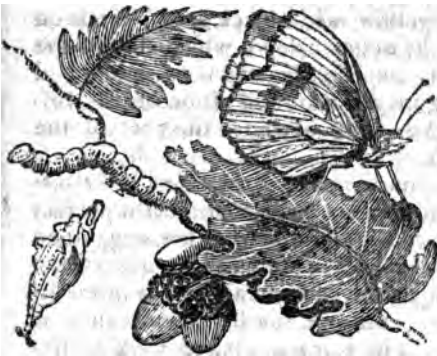
The two beautiful insects which appear on the page opposite are varieties much admired.

The first is called the *Phalena Bucephala*, or buff tip moth, a night fly ; its two horns are feathered ; first wings, grey ; with two double tranverse brown waves, and a yellowish brown spot on the extreme angle, the second wings light yellow, length scarce an inch ; the caterpillar is hairy, yellow with black spots, feeds on oaks, &c. The delicate down which clothes the upper wings is its chief beauty. It is hatched from the egg in August, and June of the following year flies, and becomes the prey of the feathered tribe.

The second on the page is the *meadow butterfly* ; when cauliflowers begin to heart, the perfect insect of the caterpillar deposits her eggs upon the leaves. The heat of the sun soon gives them life, brings forth the caterpillar, which immediately begins to consume the bed upon which it was vivified. The worm begins its transformation about the first of August, and flies a beautiful butterfly, about the middle of the same month.



**PHALENA BUCEPHALA.**



**MEADOW BUTTERFLY.**





The beautiful butterfly, called *American emperor*, is in its first stage of existence, a caterpillar, which feeds voraciously on nettles.... After preparation for transformation, it remains about three months in the torpid state, and then expands its beauteous wings, surpassing in their brilliancy and beauty, the plumage of the peacock....the cutrepresents the caterpillar on the branch, the chrysalis, or torpid caterpillar below, and the butterfly above, on the right.

Q. Give me some account of one or two of the beetle tribe ?

A. Of these insects generally, it is said that like shell fish, the bones are external, the muscles internal ; and that bulk for bulk, they are a thousand times stronger than man. The drawing annexed, is that of the *stag* or *golden beetle*, as large as life. It is known by its horns projecting like those of a stag from its head. The whole insect is of a deep brown, and is found among oaks. Their maxilla or jaws are furnished with teeth; which have the appearance of coral. They live on the oozings of the oak.

The smaller insect is also called the *golden beetle*, it is found upon flowers, particularly the rose.. The body is of a burnished golden green, tinged with red, so as to resemble as it moves burnished copper. It rivals the emerald in beauty of color.

Q. There are two other insects, which I wish some account of, and then we shall close, the *Tarantula* and *Ichneumon* fly ?

A. The tarantula bears some resemblance to the house spider. For many years it was a received opinion that the bite of this insect produced a malady which music only could cure.—

This is now considered as a vulgar error. There are many varieties of this insect....those of India are much longer limbed than those of Europe and America.

The *Ichneumon* fly, derives its name from a comparison of its real services with the supposed but unreal services of the *Ichneumon* rat of the Nile, which was fabled to destroy the crocodile. This fly destroys caterpillars, plant lice, and other insects that infest and injure plants.—They also attack spiders. Their war against other insects, has induced naturalists to compare them to cannibals; but without justice, as it appears they in truth perform only the same office as that of the domestic dog.

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These several classes are to be understood, as the title of the work implies, a simple *Epitome* of each; but they are each calculated to open the mind, by giving correct ideas at the beginning, a matter the most worthy of regard; a young person acquainted with the contents of this elementary work, will have nothing to unlearn.

THE END.





AMERICAN EMPEROR.



THE STAG BEETLE AND GOLDEN BEETLE.



TARANTULA.



ICHNEUMON FLY.











